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ETHNOLOGY.—*Bird nomenclature and song interpretation of the Canadian Delaware: An essay in ethno-ornithology.*[1] FRANK G. SPECK, University of Pennsylvania. (Communicated by HERBERT FRIEDMANN.)

This study is offered as an incentive to ornithologists and ethnologists concerned with the topic of bird life in its broadest sense.

To this end an attempt is made here to show the extent of notions possessed by the Canadian survivors of Indians constituting the Delaware Nation, whose earlier historic habitat was in the latitude of the Middle Atlantic Slope. It would accordingly not be easy to draw definite conclusions as to the regions in the East where the elements of Delaware birdlore were endemic. The Delaware have dwelt in Ontario for a century and a half. This makes it possible that their knowledge may be derived from bird observations in that locality. Or it may, on the other hand, refer to the regions whence the tribes once migrated.

We are aware that the question as to the quality of appreciation of nature among uncivilized people has long been an open one. One may assume obstinately that artificial sentiments toward nature transmitted in European tradition, in poetry, and in contemplative literature of the pastoral and reflective type come only from the writings of the nature dreamers.[2] It is, therefore, not easy for many to decide whether nature literature, purely oral of course, existed at all among preliterate peoples, for it has not been given attention by early observers who described their life ways. It is only European writers who have left accounts of native beliefs and notions, and they seldom gained insight into native feelings and cogitations regarding nature intimately enough to treat the matter subjectively. In short, whereas the growth of nature thought is preserved for us in written records, for that of aboriginal peoples we are dependent upon tradition handed down by word of mouth.

Now, however, the field takes on a wider horizon, one that must include tribes of so-called uncivilized levels whose attitude toward nature was not affected by the European aesthetic tradition. Boas thought nature appreciation to be a universal trait, observing as follows. "Aesthetic pleasure is felt by all members of mankind. No matter how diverse the ideals of beauty may be, the general character of the enjoyment of beauty is of the same order everywhere."[3]

If the Delaware Indian confides to his companion that the roar of the wind swishing through the summits of pines is the voice of the trees giving devotion to the Creator, if the Naskapi of Labrador whispers to us that when the trees on the hillside bend under the force of the wind it is the hand of the Supreme Being combing the hair of his children, should such thoughts not be placed alongside the exalted voice of Isaiah who proclaimed: "The mountains and the hills shall break forth before you into singing, and all the trees of the field shall clap their hands." However, the theme now before us revolves about

[1] Received May 3, 1946.

[2] An interesting and thought-provoking dissertation surveying the background of these ideas is given by PHILIP MARSHALL HICKS, *The development of the natural history essay in American literature*, Philadelphia, 1924. See also *Nature in American literature*, by NORMAN FOERSTER, New York, 1923.

[3] FRANZ BOAS, *Primitive art*, Instituttet for Sammenlignende Kulturforskning, Oslo, 1927, p. 9.

birds, not trees. It deals with the casual bird-mindedness not of early man in general but of a small group of Indians in Canada, the Algonkian-speaking Delawares, and explores entirely new fields of thought and observation in natural history for which there is, as yet, no system of orthodox investigation. A short historical review of the people's past is apropos.

Almost two centuries have passed since the historically famous bands of the Delaware Nation departed from their original haunts in the valleys of the Delaware and Hudson Rivers and their tributaries in New Jersey, eastern Pennsylvania, and eastern New York State. Through vicissitudes of the earlier century of alternating peace and strife with Dutch, Swedish, and English administrators and colonists, the settlements of natives composed of fugitive elements from as far east as Massachusetts and Connecticut succeeded in preserving their entity as members of a confederacy of prostrated small peoples. They became part of the loose political body known in later history as the Delaware Nation. That they still maintain this political status in the League of the Six Nations Iroquois in Ontario is fortunate for students of history, ethnology, and linguistics.

They have resided since about the middle of the eighteenth century in the basin of Lake Erie on its eastern extremity, and some 40 miles north of it, in a mixed prairie and deciduous forest horizon of the Alleghenian Life Zone. This habitat is important to hold in mind for reasons of avian distribution and environment. Assuming that ecological factors have to be considered, after migration of the people from a more southerly latitude, one can scarcely fail to wonder how much of their tradition is rooted in experience in Ontario. The migration to southern Canada would remove the people from the range of certain bird types of the middle states and bring them into that of some northern forms.

This paper covers one aspect of the knowledge still preserved in the band, treating the subject of its birdlore as known to a few of the elders in the group who are still conversant with the Delaware idiom.[4]

Concerning the idiom itself in which the bird names, calls, and some interpretations are given, it may be said that the grounds for assigning to it a single name coincident with any of the tribal names are not yet sufficiently adequate to permit more than a hyphenated classification, i.e., Munsee-Mahican. In a recent paper I have assembled the opinions of other investigators among the Six Nations Delaware (Brinton, Harrington, Michelson) who classified it as a Munsee dialect (Speck, 1945, pp. 7–18).[5] Upon closer examination of its morphology, vocabulary and phonetics, one gains the impression that Mahican contributions to the speech of the group in question are in evidence sufficiently strong to make the suggested hyphenated classification advisable for the present. The insistence of the people themselves in declaring that they are Wapanachki (Wabanaki), as are the Mahican, has been found to be valid beyond serious question. Through recent accumulation of material from its speakers a closer affinity has been discerned among Wabanaki dialects of northern New England than has hitherto been ascribed to them. This point, I believe, will appear more firmly supported in considering both speech and cultural composition of this group when the ornithological vocabulary to be presented is viewed against that of the Wabanaki proper, living to the eastward. With these suppositions I propose to leave open the question of constituency of the band until it can be better ascertained. Briefly, the Delaware group from which the bird notes have been recorded on the Six Nations Reserve is, according to historical testimony, an ethnic composite group; its dialect is a conglomerate of Wapanachki (Wabanaki) and Algonkian speech forms, and its birdlore is similarly constituted.

A word is called for as to the identification of birds and the use of English names for species by Indian people who know the

[4] The field work of 1944–45 carried on among these people received substantial support from the Faculty Research Fund of the University of Pennsylvania, Grants 555 and 570.

[5] F. G. Speck, *The Celestial Bear comes down to earth; The Bear Sacrifice Ceremony of the Munsee-Mahican of Canada as related by Nekatcit*, Reading Public Museum, Reading, Pa., 1945.

local names only by association with English-speaking communities adjacent to the reservation. The Delaware informants were often confused over bird name-identities in English and the correspondence of those terms with their own taxonomy. The Delaware bird category indeed also shows, as might be expected, some confused identities under a single name.

The Delaware informants were, as we found, acquainted sufficiently with local bird types to identify and give their own names for about 70 species. Some years ago I incidentally undertook by similar means of the ethnological approach to record names and knowledge of birds in central Maine from an aged Penobscot hunter (Wabanaki of northern New England) and published the material where it has seldom been encountered by ornithologists or ethnologists.[6] The Penobscot bird list and nomenclature accounted for about the same number of species, seventy-two, as among the Delawares. Linguistic and historical implications with the Delaware data now presented are evidence. A rather strange coincidence develops, that informants in both groups could name about the same number of birds through their experience in the bush by what we may call casual knowledge and that a noteworthy proportion of them are similar despite the differences in environment of the two Algonkian divisions.

Realizing accordingly the inadvisability of relying upon bird listing with native names from the dictation of Indians by using only name identities in English, I resorted to the color figures and factual data given in Reed's handbooks.[7] This pocket edition was used to check the identities given and to supplement attempts to control the data. Having used these pocket bird manuals on frequent occasions in recording ethno-ornithological data among Indian tribes in northern and eastern North America, I have invariably found them satisfactory. Native informants likewise respond with warm interest to the stimulus of seeing illustrations emphasizing those characteristics which would enable identification to be made without relying upon mere names. In all, it should be noted that the matter as presented is not specifically ornithological but folkloristic.

The native informants whose knowledge is now recorded were Josiah Montour, born 1872, whose Delaware name is Xkó·kwsis, "Little Snake," a descendant of the historically celebrated Roland Montour, of early Mahican descent; Mrs. Jane Battice, his sister, born 1867; Jesse Moses, Sr., born 1869, likewise of Mahican extraction; his nephew Jesse Moses, Jr.; Nekátcit, born in 1859, known by the English name of Nicodemus Peters. Other sources when referred to are given in footnotes.

The system of representing sounds throughout the paper follows the use of English characters where possible, though with some different values in cases where the native terms are not reproducible in the English alphabet; for instance *c* represents English *sh*, *x* the *ch* in German as in *"bach"*; Greek alpha *α*, the *u* of English *but;* ɔ (reversed *c*) as *aw* in English *law*, the inverted ə an obscure vowel equivalent to *e* in English *flower*. Syllable accent is denoted by ′, nasalization of vowel by the cedilla beneath, and the aspiration, as the initial *h* of English, by ˙. Crossed *l* (*ł*) is sounded like *thl* (Welsh *ll*) and *θ* like *th* in thin. By observing these variations in the sound values of English orthography, the reader should be able to reproduce the bird names with sufficient accuracy to be understood by the Delaware.

BIRD CALLS, SONGS, AND INTERPRETATIONS

Students of bird life, writing popularly or scientifically, have been inclined to attempt to transliterate what they think they hear birds utter or exclaim. The re-

[6] F. G. SPECK, *Bird-lore of the northern Indians*, Public Lectures by University of Pennsylvania Faculty, 1919–20, 7: 380, Philadelphia, 1921.

[7] C. A. REED, *Bird guide: Water birds, game birds, and birds of prey east of the Rockies*, 1910, and Part 2, *Land birds east of the Rockies*, 1912. The writer wishes to acknowledge the invaluable aid rendered in making the recordings by Ernest S. Dodge, curator of ethnology and natural history at the Peabody Museum, Salem, Mass., and his wife, Irene D. Dodge, who were members of the research party at work on the Six Nations Reserve, and participated in the bird sessions with the Delaware informants throughout the period of recording.

ception of such sounds by different ears seems to vary according to the national and linguistic tradition of the listeners. It is generally admitted, in fact candidly assumed, that few if any successful attempts have been made to describe bird songs and calls in English syllables. People in all ages and areas have tried to make nature talk in their own tongues. The humanizing of animal and even plant life has known no limit in folk tradition. Bird utterances have been a favorite playground for human fancy. The Delawares, as well we shall now see, have been as productive in word renderings of this character as the English. And like the latter their taxonomy has drawn its sources largely from avian call syllables. Just how these utterances could be endowed with sense aside from a rough resemblance to sounds, who can see? How the singing words of birds as heard by Delaware ears compared with English ears or with real vocables in any language, we can judge. It is worth noting at this point that the Indians nowhere associate bird calls with human names nor do they associate them with personalities. Who are the personalities that English tradition associates with bird memories; Bob White, Poor Will, Bob (Robert) Lincoln, Will's Widow, Mr. Peabody, for instance?

In the Delaware bird identities listed I have arranged the creatures in two groups determined by linguistic derivation of names. One is descriptive, the other onomatopoeic, the grouping in some cases optional, forty of the listed names being in the descriptive group, and twenty-three in the onomatopoeic list. It is a purely arbitrary one; a new manner of viewing source material obtained from preliterate natives. It does not follow any arrangement recognized by the Indians themselves or by students of bird life. The people, however, have devised a rough classification of birds by form and habit, since we find owls, hawks, ducks, woodpeckers, swallows, and some small birds to be designated by collective terms, and some subdivisions specified.

The generic term for bird is *awe'le'sˑus*, and has reference to a creature having the power to go by flying. The final syllables *-le'sˑus* appear in a large proportion of bird names, sometimes shortened to *-les* or *-le'o*, "he who flies," in some names, as the listing shows. The plural suffix *-(w)ak* denotes the animate classification of birds with other living organisms.

Among the Delawares now living in Oklahoma who branched off from the Canadian divisions before the American Revolution, an entirely different term denotes the Aves, namely *tcólạs*. Its etymology can not be clearly traced. Among the Six Nations Delawares (Munsee-Mahican speaking) another generic term is found, namely *jiˑts*, for birds in general.

Turning eastward to the Wabanaki tribes of Maine, New Brunswick, and Province of Quebec, we find the corresponding class designation to be *siˑps* (St. Francis Abenaki, Penobscot, Malecite), *sisip* (Micmac). Among the Mahican proper of the upper Hudson Valley as well as the Mohegan-Pequot of Connecticut, related inclusive terms are found, i.e., *jiˑts* and *djiˑts*. This substantive is evidently onomatopoeic.

The same second position elements (*-lésv(s)*, *-esˑ*), just given in the Canadian Delaware series, appear in Wabanaki bird name endings; *-lésˑu*, and *-esˑ* (shortened form).

At this point it would seem apropos to mention that the Delaware, like other Algonkian peoples of the East, hold the impression that bats are classifiable with the birds. The tribe in question applies the name *pápiˑsɔlaŋgwunés*, "skin-wing bird," to any of the bats. The related Wabanaki of northern New England call the bat *madéganiˑlésˑu* ,"skin (hide) bird" (Penobscot and Malecite), *madaganiˑlás* (St. Francis Abenaki). The mysterious bat has, indeed, been given an ambiguous zoological classification among many peoples of the world, as the word-traditions of both New and Old World languages show.

To the judgment of an ornithologist the list of species will seem incomplete for the region inhabited by the Munsee-Mahican Delawares. That a number of birds are conspicuously missing from the list is apparent. Many more might be thought to have received names with more or less accurately observed characteristics and identities. The

two or three members of the Indian band who knew the language, however, were aged persons possessing little more than a casual acquaintance with bird life. Despite the time and effort given to questioning and the display of bird pictures, their vocabulary of native bird names was limited to those given here—and some of them uncertain as to identity. Mistakes moreover inevitably lurk in the listings of native names with bird identities, for which informants and recorders are both responsible.[8]

BASICALLY DESCRIPTIVE BIRD NAMES

Măxkələnéo, "snake bird," (?) red-tailed hawk (Buteo borealis (*Gmelin*)): This hawk is said to seize a snake and carry it high, soaring before an approaching storm. The Oklahoma Delaware name is the same as the above.

Welelcócɔcalnê·ni·lat, "small bird killer," sparrow hawk (Falco sparverius *L.*).

Wápalanéo, "white bird," marsh hawk (Circus hudsonius (*L.*)).

θəni·léo, "stone bird,"—Wapándəp wéles·u, "whitehead bird,"—Mockándəp awéleo, "baldhead bird," bald eagle (Haliaeetus leucocephalus (*L.*)): The last name may have arisen through association with local whites. In the Delaware language of Oklahoma the name is *dizam.*

Mi·mi·o (meaning unexplainable), passenger pigeon (Ectopistes migratorius (*L.*)): The meaning of this proper name is lost to the informants. It is therefore optional whether to list it with the descriptive names or to regard it as onomatopoeic. Josiah Montour recalls that in his youth these birds were common and that the people used a fifteen-foot pole to knock them down from the trees where they roosted. The Delawares of Oklahoma call the bird *amí·mi.* In the Wabanaki tongues its name is of a different derivation; *blɔs* (Penobscot), *pɔláz* (St. Francis Abenaki), *ples* (Malecite), *polis* (Micmac)—terms whose etymology is not revealed.

Mowí·leo, "moaning bird," mourning dove (Zenaidura macroura carolinensis (*L.*)): The name is descriptive only in that it refers to the voice of the bird which announces impending misfortune or death to some member of the community. In Oklahoma the Delawares have expanded the idea of its voice into a phrase name, *mámendhákema,* "one who prays (or pleads) earnestly," and hold the dove in high sentimental esteem. Unlike the latter, the Canadian Munsee-Mahican have no sentiment against killing and eating the dove.

Tcúxkwi·s, "diver"—Ahάp'tcalámwi·s, "holds breath when dives,"—Tcúykhi·s, "little (bird)," mud-hen, horned grebe (Colymbus auritus (*L.*)); *helldiver* (Podilymbus podiceps): These two birds of the waterways were so confused in identity that the informants could not agree on their correct names. On account of its body shape the "helldiver" is jokingly called *ópənak,* "potato." The bird figures in folklore of Algonkian peoples almost everywhere as a butt of humor. Penobscot and Malecite give *asóps* for its name.

Wápθowé le, "white bird," wild goose (Branta *sp.*): The Wabanaki names refer likewise to whiteness; *wámptogwe* (Penobscot) *wáptuk* (Malecite), while it is *mogəlé wite* in Micmac.

Sək cí·hweo, "black duck" (Anas rubripes tristis *Brewster*): The generic term *cí·hwe* for duck goes back to a stem (*ci·*) for this bird group fairly uniform over a wide area in the East and North. Whether it is basically a mimetic sound or not is not easy to conclude. The generic term for duck in Eastern Wabanaki is *mədəhés·im.*

Xwás(θ) cí·hweo, "wood duck" (Aix sponsa (*L.*)): The name is another of the few Delaware terms listed that have been taken over from local white hunters. Other species of duck if referred to by the Delawares would be described by adjectives corresponding to their local English names.

Pəléo, "chewer (?)," wild turkey (Meleagris gallopavo silvestris *Vieillot*), (*also the domestic race*): Usage has adopted a different descriptive name for the bird among the Delawares of Oklahoma who call it *tcí· kənəm,* "he scratches (the ground)." A different series of name stems prevails in Algonkian languages to the eastward. They seem to be mimetic in origin, descriptive in usage—*néheme* (Penobscot), *nahamá* (St. Francis Abenaki), *ne'p* (Malecite), *neyhom* (Narragansett, Roger Williams).

Á·kwdləne, "sleeps through the day," long-eared owl (Asio wilsonianus (*Lesson*)); *great*

[8] The nomenclature used in this report is taken from FORBUSH, E. H., and MAY, J. B., *Natural history of the birds of eastern and central North America,* Boston, 1939.

horned owl (Bubo virginianus (*Gmelin*)).

Lə́ni· k'hókos, "common, or original owl,"—Xóweŋgewi· k'hókos, "old fashioned owl," barred owl (Stryx varia *Barton*).

Wápi· k'hókos, "white owl," snowy owl (Nyctea nyctea (*L.*)): Essentially the same in the Wabanaki languages.

Kázwemwi·s, "killer," screech owl (Otus asio naevius (*Gmelin*)): Wabanaki cognates are *kamkámes·v* (Penobscot), *kapkámɔs·* (Malecite).

Tcáŋga k'hókos, "little owl," saw-whet owl (Cryptoglaux acadica (*Gmelin*)): Some difficulty was met with among informants in reaching conclusions over the identity of the owls in their own language. The questions were finally settled as given above, the identities of the two larger forms made by their vocal efforts. The term *k'hókos* is uniform for the series with minor variations over a wide area where Algonkian languages are spoken in the east, as the following examples will show: *kóhus* (Oklahoma, Delawɑre), *kokhokhas·v* (Penobscot), *kok'okhás* (Malecite), *kúkugwés* (Micmac).

Sək' awéles—Sək' awéleo, "black bird," crow (Corvus brachyrynchos *Brehm*): *Áhasu* (see under Onomatopoeic names).

Putci·lí·lelés·us, "butcher (derived from English) *bird," butcherbird* (Lanius *sp.*): The name deserves no further comment than to mention its English origin indicative of a kind of borrowing with loss of the native equivalent.

Tcatcanáxaxkwes, "striking at hazard on a tree," hairy woodpecker and downy woodpecker (Dryobates villosus (*L.*), D. pubescens (*Swainson*)).

Éyoθ awéleo, "dips while flying," flicker (Colaptes auratus luteus *Bangs*): There is no cognate to this name in Wabanaki idioms. The Penobscot term is *táwalotc.*

Lexáwani·tcis; "fork-tail (swallow)," purple martin (Progne subis (*L.*)); *barn swallow* (Hirundo erythrogaster *Boddaert*): No differentiation of forms could be traced among informants.

Né'ni·mtcémwɔθ (né'ni·mtcéo), "lacrosse player," chimney swift (Chaetura pelagica (*L.*)): The bird's erratic motions in the air suggest the movements of Indian ball-players contesting to score a goal. Contrast this ancient idea in the name with the Penobscot *tcímili·las·is,* "chimney bird."

Li·li·tcas—Mi·li·tcas, "smelling around (flowers)," hummingbird (Archilochus colubris (*L.*)): The variations in word form are given as pronounced by Josiah Montour and his sister, Mrs. Battice. In the Wabanaki speech we have *ani·tás·is,* "the hoverer" (Penobscot), *nanatás·is* (St. Francis Abenaki), *yalamés·it* (Malecite), with the same meaning.

Célamxákwus, "under the log," house wren (Troglodytes aedon *Vieillot*): The secretive flight habit of the bird is explained in folklore as being due to fear of the "lion" by day. A similar idea of the bird's habit is revealed in the Penobscot name *alɑmlabíkɔs·i·s,* "under hiding bird."

Lawákaník·an wéles·us, "middle of field bird," horned lark (Otocoris alpestris *subsp.*).

Ólələn·e, "blue tail (?)," wood thrush (Holocichla *sp.*): There was some doubt in the informant's mind whether this name was onomatopoeic or descriptive.

À'ki·hes·, "planting bird"—Ehá'ki·es, "farmer bird," mockingbird (Mimus polyglottos (*L.*)): A rendering of the profusion of musical syllables uttered by the bird in question has become a tradition among the Delawares of this band. To their ears the following phrase is a repeated admonition to plant corn to ward off famine. It goes *tokí· tokí·k ehakí·' ehakí ski· ski kəmút* (with variations), *"tokí·'tokí·k* plant! plant! urinate! urinate! (to fertilize?) (lest) you steal!" Its arrival in their territory is accordingly a sign for the industrious to begin farming, and a warning to the slothful to avert the necessity of pilfering the crops of others in the season of harvest. The transliteration is furthermore a specimen of aboriginal humor.

Considerable discussion arose among three of the Delawares over the specific identity of this bird. The question centered about its appearance in the territory inhabited by them. An examination of ornithological literature on distribution of the bird allows for the possibility of its occasional appearance north of Lake Erie. Inasmuch as the mockingbird is a nonmigratory species and seldom gets to Canada, the present bit of folklore may possibly be a relic of the southern, pre-Canadian lore of the Delawares.

The Indians of the Reserve expressed no uncertainty of the identity of the mockingbird as distinct from the brown thrasher. Illustrations and a lengthy discussion of the differences in color of the two birds failed to convince them

of possible confusion of the two. They assigned a distinct name to the latter and were aware of the distinctions in feather markings characteristic of both forms. The conclusion was therefore reached that the mockingbird was known to them by observation and by name, and so the matter will be left for treatment by students of bird distribution in Canada to be checked by expert observation. In Oklahoma the Delawares, who are without question familiar with the mockingbird, designate it by reference to its polyglot gift, *nehəni·sk'tónhes*, "he talks about something."

Otán awéles·us, "town bird," English sparrow (Passer domesticus (*L.*)): This term indicates the late acquaintance of the people with the introduced species and correct observation of its preferred habitat.

Lən·owéles·us, "common (or native, original) bird," chipping sparrow (Spizella passerina (*Bechstein*)): The distinction between this species and the preceding lies in the recognition of their nativity.

Ci·ksánəle, "spread tail-feathers," kingbird (Tyrannus tyrannus (*L.*)): The bird's name is "belittler, scorner" in the Wabanaki area, *mesándjes·u* (Penobscot).

Wi·sawelés·u, "yellow bird," Baltimore oriole (Icterus galbula (*L.*)); *yellow warbler* (Dendroica aestiva (*Gmelin*)): This name is applied possibly to the American goldfinch male in summer plumage, as far as could be learned from the informants.

Apatcémwes, "come back bird," meadowlark (Sturnella magna (*L.*)): The name has reference to its return north in the spring.

Pki·hixkaláygwes, "looking close for something," crossbill (Loxia *sp.*); *nuthatch* (Sitta *sp.*): The same name was given for both birds without possibility of clarification.

Ci·wópekli·s, "blue bird," bluebird (Sialia sialis (*L.*)).

Áxkokweldəpwi·l, "cook snake head," red-wing blackbird (Agelaius phoeniceus (*L.*)).

Cikáks awéles·us, "skunk bird," bobolink (Dolichonyx oryzivorus (*L.*)).

Kówi awéles·us, "cow bird," cowbird (Molothrus ater (*Boddaert*)): Observation by the Delawares has resulted in the same name prevalent among the whites.

Cəwáni·les, "south, or salt-water, bird," snipe (Capella delicata (*Ord*)); *woodcock* (Philohela minor (*Gmelin*)): Either translation given is applicable to the species mentioned. The reference to salt-water indicates the former residence of the tribe on the middle Atlantic coast and may therefore be an ancient name carried to Canada in the migration of two centuries ago.

Xwdtcə cəwani·les, "big south, or salt-water bird," killdeer (Oxyechus vociferus (*L.*)).

E'ki·ndjis, "little counting bird," brown creeper (Certhia familiaris americana *Bonaparte*): So named from its habit of moving up and down the bark of trees as if counting out or searching for something.

BASICALLY ONOMATOPOEIC BIRD NAMES

Mâlis—Méli·s, phoebe (Sayornis phoebe (*Latham*)): The 2-syllable equivalent of the call given by these birds seems to be the basis of their inclusion under one name of reference.

Tcəyga méli·s, "little méli·s," wood pewee[9] (Myiochanes virens (*L.*)).

Tcákwalè, blackbird (sp.?) (bronzed grackle, and even red-wing blackbird according to one source): Again a resemblance to Mohawk (Iroquois) *djókwari·s* denoting the same bird. The corresponding Wabanaki name *tcəgwulúsk* also refers to the last two birds whose identity is combined in Penobscot and Malecite. The Oklahoma Delawares depart from the term in calling them *tckənák*ʷ. That this is an ancient name for the blackbird among tribes of the Atlantic slope area is revealed by the entry in Edward Topsell's manuscript (circa 1614) giving "chugwareo" for the red-winged blackbird in the Virginia Indian language.[10]

Tí·ti·s, bluejay (Cyanocitta cristata (*L.*)): The term is fairly constant in the East; *di·dias* (Penobscot), *títias, tides·ó* (St. Francis Abenaki), *títis* (Micmac).

Tci·ckó'kos, robin (Turdus migratorius *L.*): A certain uniformity is to be observed in

[9] On the islands off the coast of southern Massachusetts the name "moneybird" is given to the chickadee, phoebe, and wood pewee. The birds' calls are heard as equivalent of "taubut," meaning "thank you" in the Algonkian speech of the Southern New England Indians, the thanks being intended for the money that the birds refer to as about to be found. To these Indians the chickadee is understood to say the same thing and is likewise called the "moneybird" (information Mrs. C. Ryan, Gay Head Indian settlement, Marthas Vineyard, Mass., 1925).

[10] J. R. SWANTON, *Newly discovered Powhatan bird names*, Journ. Washington Acad. Sci. **24**: 97–98. 1914.

names for the bird in native languages of the East irrespective of their linguistic affinities. For instance the Cayuga and Mohawk (Iroquoian stock) of the Six Nations Reserve and adjoining the Delawares denote the robin by *tcí·ckogo*. The Delaware name is evidently related to the Mohawk, not to the Wabanaki term *wi·kwúskesu*. There was a Robin Dance in the ceremonial cycle of rituals of the tribe.[11]

Kaxkówes, brown thrasher (Toxostoma rufum (*L.*)); *cuckoo* (Coccyzus *sp.*): *Kax kax* is understood as the sound of their call notes, whence is derived the name of the birds that emit those syllables.

*Máxk*ʷ*tci·li·li·s, chickadee* (Penthestes atricapillus (*L.*)): The onomatopoeic portion of this term (*-tci·li·li·*) occurs in chickadee names among Indians over a wide area of the East, examples of which are given. The constancy of the name in various unrelated families of speech is evidently due to the clearness of utterance of the bird's canto in the acoustics of most people. That the common English name chickadee is Indian origin in America may not therefore be unreservedly true. The Penobscot equivalent is *ktci·gi·gi·tás·i·s*. Even the faraway and unrelated Cherokee of North Carolina give it the name *tcikili·li·t*.

*Pi·ck*ʷ, *nighthawk* (Chordeiles minor *Forster*)): The onomatopoeia in this case is an excellent echo of the bird's call note. Ornithologists have recorded a close equivalent, *peent* (F. M. Chapman, *Handbook of birds of eastern North America*, 1903, p. 238). A larger variety of the creature is said by the informants to exist in the country, called *xwátcəpi·ck*ʷ, "big nighthawk." A popular belief also says "if a piece of deer meat is burned when it appears it will come down to earth, otherwise it never does." Josiah Montour mentioned another old folk belief that the bird fears the "lion" by night, as the wren does it by day, thus accounting for its erratic flight.

Related forms of the same name are found in other eastern dialects, *pick* (Oklahoma Delaware), *pesk* (Penobscot, Ojibwa), with only slightly variant forms in Iroquois Cayuga.

A formal term denoting the nighthawk is *pí·ckwəlanéo* when its name is referred to as the title of a mimetic dance in the series of rites anciently performed in the Delaware Long House. The Nighthawk Dance was a ritual in which certain dancers carried feather wands. It symbolized peace and war as antagonisms which are believed to be demonstrated in the character of the bird (Speck, 1945, p. 76) arising through the booming sound produced by the bird in flight. It is connected with the myth of thunder which symbolizes aerial and terrestrial warfare.

We'kóli·s (*wé'kwəlt·s*), *whippoorwill* (Antrostomus vociferus (*Wilson*)): The sound quality of this bird's voice is given in a 3-syllable imitation of its call noticeably constant in native languages of the East. The name series is most interesting.

In Oklahoma the Delawares hear the bird's call as *tcolulhówe*. In the central Algonkian and New England dialects the equivalents hold closer to the Canadian Delaware, viz., *wákowis* (Saulteaux), *wahonési* (Ojibwa, Lake Timagami, Ontario) (given as *wawonaissa* by Longfellow in Hiawatha), *kukuwé* (Fox of Oklahoma), *makowi·s*, "little child or dwarf" (Mohegan), *wi·polés·* (Penobscot), *papolés* (St. Francis Abenaki), *wekwi·t·tc* (Micmac). The linguistically unrelated Cayuga (Iroquois of Six Nations, adjacent to the Delawares) call it *gwękuyé'*, while the Catawba (South Carolina) linguistically distinct from all of the preceding give a similar sound-form *witkoyą́*, and the Cherokee (North Carolina) *wagult·'*. Finally we note the interesting form of the echoic name among the Dutch settlers of the lower Hudson Valley as *quote-ker-kee*, recorded by Neltje Blanchan (*Bird neighbors*, 1922). The Canadian French hear the call as *pois pourri*, or "rotten pea." To none of the northern people is the bird's presence a happy omen. The poetical fancy entertained by the southern Indians that the whippoorwill does not appear until the ladyslipper (*Cypripedium acaule*) blooms so that the bird can use it for a hat is not revealed by inquiry among northern tribes so far (F. G. Speck, *Whippoorwills, nighthawks and ladyslippers*, Gen. Mag. and Hist. Chron., Univ. Pennsylvania **36**: 595. 1934).

Máxkaweles·—Máxkawelácí·c, "red bird"; Sótcəl awelásos, "soldier bird," scarlet tanager (Piranga erythromelas (*Vieillot*)): The first name listed was given by Nicodemus Peters

[11] F. G. Speck, *The Celestial Bear comes down to earth; The Bear Sacrifice Ceremony of the Munsee-Mahican in Canada as related by Nekatcit*, Reading Public Mus. Sci. Publ. No 7: 74. 1945.

(deceased 1938), the second by Josiah Montour. The latter has reference to the red-coated British soldier so familiar to Indians a century ago.

Kaskáskwəli·s, song sparrow (Melospiza melodia (*Wilson*)): The sound phrase is considered to be a close reproduction of the first part of the spring melody of the bird, and from this its name is derived. The full equivalent of its utterance is "kaskáskwəli·s asi·'takəlá's, məsá'si·tepók." The last word of the phrase is interpreted to say "cold feet." The reference to cold feet indicates the suffering that the bird expects to undergo before steady warm weather starts in during the uncertainty of a belated spring.[12]

The Delawares are conscious of the similarity of their own name for the bird to that given it by the neighboring Mohawk, who interpret its song as saying "kaskáskəli· sa'si·takalá's," "your foot smells foul."

Equally expressive is the Penobscot euonym *sulsulsuwí·* for the song sparrow. The tunefulness of names given the bird in many eastern dialects is noteworthy among people of the northern latitudes who perceive the return of spring in the singing syllables of such a melody as is given forth. In Malecite the term is practically the same (*sulsulsulí·*) while St. Francis Abenaki has *kaskaldjás*, a closer analogy to the Delaware name.

Tcuwí·yu', towhee, Pipilo erythrophthalmus (*L.*)); *ca'bird*, Dumetella carolinensis (*L.*)); *bobolink*, Dolichonyx oryzivorus (*L.*): It may be imagined that the local name chewink used generally among whites in parts of the East has been imitative of the Delaware name, yet the distinct character of the bird's call could be considered as the source of the name in any group of residents, white or Indian. The occurrence of the single Delaware term applied to three distinct bird forms is a corroboration of the idea previously expressed in respect to the basis of classification of birds by their utterances rather than by morphological characteristics. This is another truly old bird name among the Indians of the Virginia Algonkian area, for the Topsell manuscript (1614) gives "chuwheeo" for the towhee. (See reference to Swanton, 1914.)

Mémeo, pileated woodpecker (Ceophloeus pileatus abieticola *Bangs*): This great bird is a figure in eastern Indian myth and legend. The Delawares interpret its call into English, hearing it as *wet! wet! wet!*, a sign that it will soon rain. The bird's beak was used to clean out the ears of a person afflicted with deafness.

The name *méme* is unquestionably an old one, general among Algonkian-speaking tribes of the North Atlantic region, and an ancient representation of the bird's call unchanged through time. In the Wabanaki tongues we have *méme* (Penobscot), *máma* (St. Francis Abenaki), *méme* (Ojibwa).

Mămaxókwəs, "mémeo red head," red-headed woodpecker (Melanerpes erythrocephalus (*L.*)): The apparent relationship of this to the preceding bird is responsible for its secondary name. Exact identity was uncertain.

Mɛ̆'k'hɑm, "pump," bittern (Botaurus lentiginosus (*Montagu*)): Here is a correspondent to the utterance of the bird as it has appealed to European ears, described graphically by authors as related names appear in the Wabanaki area; *pokhámənəs* (Penobscot and St. Francis Abenaki).

Káxko, great blue heron (Ardea herodias *L.*): This echoic term is another constant in bird nomenclature of the eastern tribes, viz. *kásko* (*kaskʷ*) (Penobscot).

Âhasu, crow (see under descriptive names): This mimetic term corresponds to Wabanaki forms, *kagó's* (Penobscot).

Â·kawán·eo—Mətéwi·le, American and red-throated loon (Gavia *sp.*): The first term is a form of the sound of laughter uttered by the bird, as the informant added "ha ha kowane, ha ha, he says." The second was not clearly translatable. It is a cognate with the name applied to the bird by the Wabanaki people of northern New England, *mədéwi·le*, Penobscot, *madawi·lá*, St. Francis Abenaki (see Gull below).

Ka·kʷ, wild goose (Branta *sp.*), *swan* (Cygnus columbianus (*Ord*)): Informants were un-

[12] An appreciation of the same quality of its song as that sensed by the Indians is shown in the following words of F. SCHUYLER MATHEWS: "It is not possible to listen to the melody of the Song sparrow in early March without realizing for the time being that we are released from the cold clutch of winter and set down in the comfortable lap of spring" (*Field book of wild birds and their music*, 1904, p. vi). In the body of his book (pp. 111–123) he devotes about ten pages to attempts at musical transcriptions and word equivalents of this bird's song.

able to differentiate the names of the two birds. The swan to them is nothing more than a vague memory. The name is derived from the flight call of the goose, it would seem.

Ákawanéo, gull (species not differentiated) (Larus *sp.*): The Delaware notion that the bird announces itself by the cry *ákawa-* is related to the Wabanaki idea in the vocables *ki·aksi·s* (Penobscot), *kiák*ʷ*si·s* (Malecite), *kákwi·s* (St. Francis Abenaki) as names for the herring gull.

Po·pó·kus, quail (Colinus virginianus (*L.*)): The name is derived from its call, which to European ears suggests *bobwhite*. The same name appears in several forms in eastern Algonkian tongues as *popókus* (Oklahoma Delaware).

Pa·pá·ko, ruffed grouse, partridge (Bonasa umbellus (*L.*)): The drumming of the male bird is denoted by the verb stem of its proper name.

Ki·kí·pus, chicken (domestic).

Migrational lore of the Canadian Delawares has been collected recently by Jesse Moses, a member of the group, and placed at my disposal for use in this report:

All feathered wildlife that cannot endure the severity of the northern winter migrates southward in the fall in the order of the first to leave in the fall being the last to return in the spring.

The small birds and ducks are believed to have chosen their mates before returning north, while the geese return in flocks leaving the ganders to battle it out for their mates on the breeding grounds.

Occasionally some of the hardier birds, such as the song sparrow and jay, do not go south for the winter, which indicates an open mild winter.

An early migration either way portends an early change of season. The non-return of normal bird life means a lean year, while an unusual number augurs plenty. The presence in this area of the snow-field birds, white owl, northern lark, waxwing, and snow bird, means an unusual depth of snow and severe cold in their regular habitat.

It is known that birds, ducks and geese, return to the locality where they were hatched, with the parent pair having priority in their particular nesting place.

The V formation of flocks of ducks and geese in flight is believed to be held for reasons of protection. In flight the neck can only be carried in a straight line and the head has very little range of turning. So the position and behaviour of the leader is transmitted visibly from him or her, as the case may be, down the line by that eye of the follower on the inside of the V formation, while each one in the flight has open vision on the outward side. Signals of the intention of the leader are sounded and relayed by others in the flock.

The sense of direction in flight by day or night is held by the calling of a manitu, according to which one is to govern the coming season, be it winter or summer over which the manitu of the north or the heat of the south is to rule. There is another belief that the rolling of the thunder northward or southward in the late winter months indicates whether spring is to take over soon or is to be pushed southward again for a time. These signs indicate the struggle taking place among the manitu forces over the question of control of season.

High-flying flocks are believed to foretell lean physical conditions for the approaching season, low flying flocks the reverse.

The foregoing observations are recalled from narrations by my uncle Cornelius Moses and some other old Delawares.

We have not as yet recorded the belief among these Delawares that small birds migrate on the backs of geese, loons, cranes, or other large birds. That this legend has not been recorded seems strange in view of its occurrence among Wabanaki tribes farther east who are linguistically akin to the Delawares.[13]

[13] The extent and variation of this belief among northern Algonkian-speaking tribes were made the subject of some review and discussion in an article by the writer published in 1921 (Speck, *op. cit.*, pp. 374–379).

ANTHROPOLOGY.—*More filed Indian teeth from the United States.*[1]

T. D. STEWART, U. S. National Museum, and P. F. TITTERINGTON, St. Louis, Mo.

In 1944 we described in this JOURNAL four examples of filed Indian teeth coming from a small area within a radius of 40 miles of St. Louis, Mo. At the same time we mentioned two other examples that had been reported but that we had not seen. One of these, originally from Arizona, had been sent to Australia but has now been described by Campbell (1944).[2] The other, from Macon, Ga., was referred to briefly in our footnote 4, as follows: Dr. Gordon Willey tells us that a skull with a transverse groove on the labial surface of each median incisor was found in a Lamar culture site near Macon, Ga. Efforts to secure this skull for examination have been unsuccessful thus far." Not until February of this year was this specimen finally located and sent to one of us (T.D.S.) for study.[3]

Since our report brought together unexpected evidence of a widespread, unfamiliar custom among the late prehistoric Indians of the United States, we anticipated that anthropologists with skeletal collections of these Indians would soon find more examples and would make them known. So far, rather surprisingly, only one new specimen has appeared, and it was discovered in an Illinois collection by one of us (P.F.T.). This being the case, and a sufficient time having elapsed for searches of collections to be completed, it seems desirable to record without further delay these two undescribed specimens. There is the further motivation that both of these two new specimens exhibit transverse grooves of the upper median incisors, which, heretofore having been seen only in an isolated tooth, gives increased significance to this unique type of dental mutilation.

DESCRIPTION

Macon, Ga., skull (46-8/13B:25).—The burial of which this skull is a part was found with associated small disk shell beads in a small mound, known as the Tufts Mound, near the Ocmulgee River bluffs in South Macon. Dr. Kelly[4] characterizes this mound "as presenting an interesting deposition of a Swift Creek and early stamped pottery complex over an original 'potteryless' or 'pre-pottery' site." He regards the burial in question as intrusive, because the associated beads, in his experience, can be typical of either Macon Plateau or Lamar burials. This means that the Macon Plateau and Lamar cultural complexes, being of the Middle Mississippi phase, are late prehistoric, whereas the Swift Creek complex is much earlier (cf. Waring and Holder, 1945, pp. 22–25).

Inspection of the skull reveals a round- and high-headed individual (undeformed (?); C.I. 84.0; Mean Ht. I. 96.0), probably a female, in early middle age. The sex is suggested by such things as the small size (cranial module 148.0), absence of supraorbital ridges and muscular markings, rounded chin, etc. Age is indicated by the good condition and moderate wear of the teeth together with beginning ectocranial suture closure (endocranial closure is advanced).

The most striking features of this skull however are two symmetrically placed depressed scars on the frontal bone[5] and a set of aligned grooves crossing the upper median incisors (Fig. 1). There is no reason to believe that these features or defects have any etiological connection. The frontal scars probably are either traumatic in origin or due to syphilitic gummata. Lesions seemingly due to syphilis are quite common in collections of bones from sites of the Middle Mississippi cultures. On the other hand the dental mutilation, if such

[1] Received June 17, 1946.

[2] Recognizing the importance of this specimen to American anthropology, the South Australian Museum courteously has returned it to the U. S. National Museum.

[3] We are indebted to Dr. A. R. Kelly for his efforts in locating this specimen and for making it available for study.

[4] Personal communication, dated February 5, 1946. See also Kelly, 1938, footnote 6, p. 26.

[5] Two other scars can be felt better than seen.

it is, can be only a deliberately planned artifact.

As seen under magnification (Fig. 2) the grooves in the upper median incisors present some unusual details. In each tooth the superior edge of the groove is rounded, somewhat lobulated, and undercut, whereas the inferior edge is gradually sloping or beveled and smooth. The groove in the right incisor crosses the entire width of the labial crown surface, but the groove in the left incisor fails to reach the edges of the labial surface and especially on the medial side. Here the groove is almost completely blocked by intact enamel. The latter is rounded and somewhat undercut. This fact makes it difficult to understand how a crude file could cut as deep as the defect indicates without cutting all the way across the tooth surface. Indeed, when observed from the side, the continuity of the two grooves is spoiled by this block, which suggests that a continuous motion of a blade file could not have been employed to produce the two defects.

In the depths of each groove a secondary carious process has developed. Also, in each case the enamel surface between the groove and the neck of the tooth is slightly pitted as in true hypoplasia. The grooves themselves do not correspond to the usual hypoplastic defects, both because of the atypical beveled inferior edges and because of the fact that there are no corresponding defects on the other anterior teeth.[6]

Hypoplastic enamel usually appears in all tooth-crowns undergoing development at the time the disturbance in enamel formation took place. In the present case the defects in the upper median incisors correspond to the increment level reached at about the third postnatal year. At this age the crowns of the lateral incisors, canines, and premolars, both upper and lower, also are developing, yet in the present case none of these show such defects.[7]

Contrarily, of course, the distributional limitation of the grooves and their beveled edges partly correspond to the conditions in the next case to be described, the artificial nature of which is unquestioned.

Dickson skull (D-22).—In August of 1944 one of us (P.F.T.) spent a day at the Dickson Mound Museum at Lewistown, Ill. In the course of examining some of the skulls of the Dickson collection for filed teeth the specimen to be described was discovered. Dr. Don F. Dickson states[8] that this skull was recovered from a burial exposed over 40 years ago in grading the upper part of the mound for buildings. The skull, without its lower jaw, was the only part saved.

Although there were no cultural associations with this burial, the Dickson cemetery, according to Cole and Deuel (1937, p. 121), is classified as Middle Mississippi. Indeed, they say that "the virtual absence of materials which might be classed as Woodland serves to mark [the Dickson cemetery] as a 'pure' Mississippi site." In addition, Neumann (1937) reports that most of the skulls from this site are deformed.

On examination the skull shows moderate fronto-vertico-occipital deformity and appears to be a young adult female. All the cranial sutures are open, with the probable exception of the basilar, which is almost completely destroyed. The teeth show only slight wear.

As seen in Fig. 1, the upper median incisors are crossed by a set of aligned grooves somewhat closer to the incisal edge than in the previous case. When these grooves are observed from the side, their alignment and continuity become more apparent. This suggests that they were made at the same time and that the filing instrument made a continuous sweep across both teeth. This filing process perhaps was facilitated by the

[6] The lingual surface of each upper median incisor is shovel-shaped as in most Indians. The proximal end of the shovel basin, unusually squared and slightly pitted, is at exactly the same level as the defect on the labial surface and, of course, corresponds in direction.

[7] Dr. T. J. Hill, of Cleveland, Ohio, and Dr. Daniel J. Lynch, of Washington, D. C., both feel that the grooves are artificial and both advanced these arguments in ruling out hypoplasia. We are indebted to these men for giving us the benefit of their opinions.

[8] Personal communication dated September 14, 1944. We appreciate Dr. Dickson's kindness in sending the specimen to the U. S. National Museum for study.

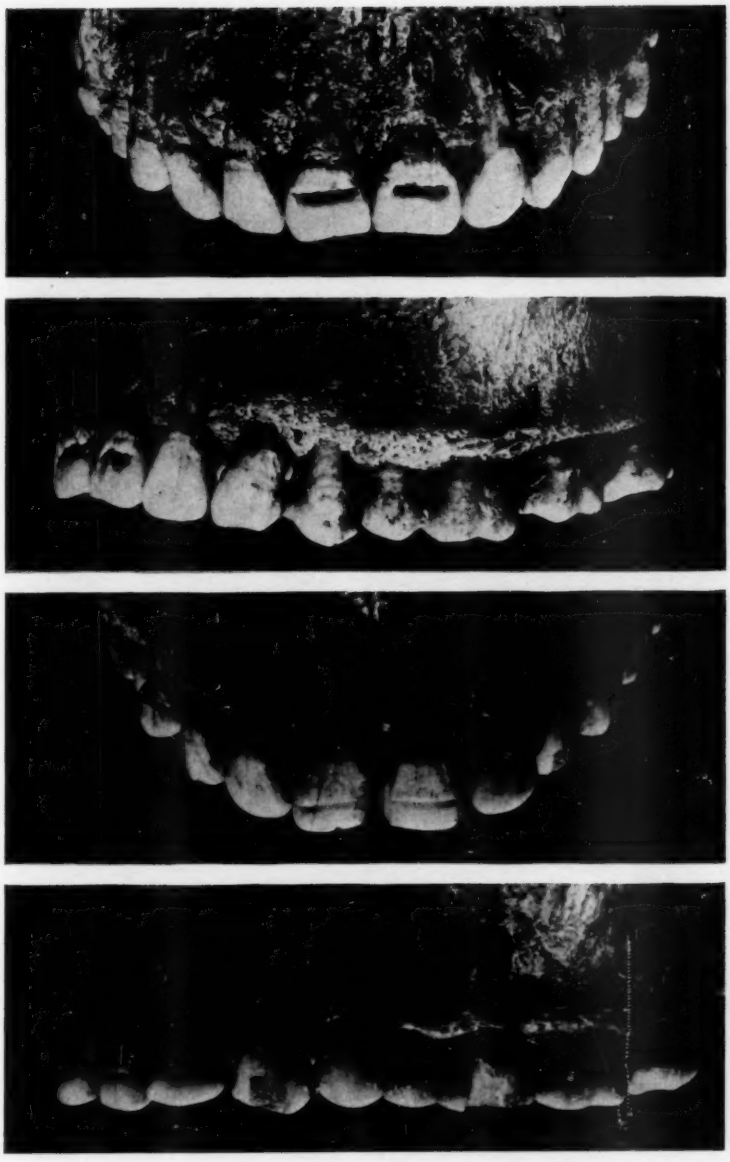


FIG. 1.—Upper two views show the defects in the median incisors of a skull from Macon, Ga. (46-3/13B: 25). Lower two views show the defects in the median incisors of the Dickson skull (D-22).

FIG. 2.—The defects in the median incisors of the skull from Macon, Ga., seen in enlargement (×3).

fact that both of the median incisors had undergone a slight inward rotation. As seen under magnification, the edges of these grooves are rounded as from polishing and the striations left by the file are largely obliterated.

A small ∧-shaped notch in the incisal edge of the right median incisor will be noted. This is perhaps an incomplete expression of the multilation pattern exhibited by the isolated Cahokia tooth described in our previous paper.

DISCUSSION

The above description leaves some doubt as to the artificial nature of the dental defects in the skull from Macon, Ga. This doubt arises from the fact that these defects have some of the characteristics of hypoplasia; that is, at some points about the edges of the defects the enamel is rounded, lobulated, and undercut. Even the alignment of the defects is characteristic of hypoplasia. However, as pointed out above, the absence of like defects at corresponding increment levels on the other anterior teeth rules out generalized hypoplasia.

But we still have to consider the possibility of local disturbances of enamel formation. According to Bunting and Hill (1940, p. 94) this may occur as a result of abscesses on overlying deciduous teeth. Although such a possibility can not be excluded in the present case, it would seem highly unlikely both because of the low incidence of caries in deciduous incisors among Indians and because of the high resistance to decay exhibited by the permanent teeth.

The alternative is to regard these defects as artificial but altered by secondary caries and by abrasion resulting from many years of chewing coarse foods. The age of this individual favors this view, as does the cultural setting in which the burial occurred. Nevertheless, without the supporting unquestionable evidence of the Dickson specimen, derived from the same cultural phase, we should hesitate to characterize the dental defects in the Macon specimen as artificial.

With this reservation we may pass to the significance of these new finds. First of all, it is clear that the type of dental mutilation consisting of filed transverse grooves was not an isolated experiment of the American Indians. There are now examples from two different sites in Illinois, and perhaps one from Georgia. Secondly, so far as we know, this type of mutilation was unique to the Indians of the eastern United States. Thirdly, the belief is supported that within the United States all types of dental mutilation were confined to the peoples of the Middle Mississippi culture phase in the East and to contemporaneous peoples elsewhere. In other words, all seven specimens thus far described relate to the late prehistoric period. And fourthly, dental mutilations were not limited to one sex.

Finally, we should like to repeat our belief that tooth grooving, through its association with tooth notching, indicates contact with Middle America, where the latter practice was common. Furthermore, since tooth grooving seems to be unique to the area of the United States, this may mean that "distance and a new setting had released the original custom from its habitual limitations."

LITERATURE CITED

BUNTING, RUSSEL W., and HILL, THOMAS J. *A text-book of oral pathology for students and practitioners of dentistry*, 460 pp. Philadelphia, 1940.

CAMPBELL, T. D. *The dental condition of a skull from the Sikyatki site, Arizona.* Journ. Washington Acad. Sci. **34**(10): 321–322. 1944.

COLE, FAY-COOPER, and DEUEL, THORNE. *Rediscovering Illinois: Archaeological explorations in and around Fulton County*, xvi + 295 pp. Chicago, 1937.

KELLY, A. R. *A preliminary report on archeological explorations at Macon, Ga.* Bur. Amer. Ethnol. Bull. 119 (Anthrop. Paper no. 1): 1–68. 1938.

NEUMANN, GEORG K. *Preliminary notes on the crania from Fulton County, Illinois.* Appendix IV in "Rediscovering Illinois" (see Cole and Deuel): 227–264. 1937.

STEWART, T. D., and TITTERINGTON, P. F. *Filed Indian teeth from Illinois.* Journ. Washington Acad. Sci. **34**(10): 317–321. 1944.

WARING, A. J., and HOLDER, PRESTON. *A prehistoric ceremonial complex in the southeastern United States.* Amer. Anthrop. **47**: 1–34. 1945.

ARCHEOLOGY.—*A prehistoric Indian site on Selden Island, Montgomery County, Md.*[1] RICHARD G. SLATTERY, Washington, D. C. (Communicated by W. R. WEDEL.)

On October 21, 1945, Hugh V. Stabler and the writer explored Selden Island in the Potomac River, Montgomery County, Md., for signs of early Indian settlements. A chance test pit dug into a low ridge on the island disclosed disturbed soil mixed with charcoal, burnt earth, and aboriginal artifacts. This discovery led to subsequent excavations and the partial delineation of a hitherto undescribed archeological complex.

Selden Island, located about 30 miles northwest of Washington, D. C., is named after an early owner. At the present time it is part of a 700-acre tract of land owned and operated by W. A. Walker, of Ashburn, Va. The Potomac River at this point has carved a passageway through a stratification of Triassic sandstone, creating a valley 1½ miles wide, with 100-foot bluffs on each side. The island, which is about 2½ miles long by half a mile wide, lies near the Virginia shore. The highest point on the island rises about 30 feet above the river level at normal flow and 200 feet above tidewater.

The site under discussion occupies a terrace in the east third of the island about 200 yards southwest of the main stream and is half a mile east of a brick house constructed nearly a hundred years ago. At least two other aboriginal village sites are known to exist on the island.

At the site in question there was no concentration of surface debris to indicate that prehistoric man had ever occupied the spot. Recurrent floods have deposited their load of silt on this part of the island, covering any signs that may have been left by ancient man. However, an occasional sherd, arrowpoint, or other worked stone may be picked up on the surface at this point as on almost any other cultivated spot on the island. It is perhaps reasonable to assume, therefore, that these artifacts were brought to the surface by the plow or, in some cases, were scattered by later Indians.

Since its discovery the site has been excavated by means of numerous test trenches dug at intervals in a 30- by 35-foot area adjacent to the first pit. Owing to the excessive overburden of sterile soil (14 to 18 inches) and our limited facilities, it was impractical to strip off the entire surface to subsoil level. For these reasons the exact extent of the area occupied has not been determined. The aboriginal features discovered consist of a series of 12 separate rubbish-filled pits each conforming to a nearly circular shape (see table). The walls were generally vertical with little variation from top to bottom; however, three pits, Nos. 3, 9, and 12, apparently had sloping basinlike walls. The diameters, measured at the contact between dark topsoil and light-colored subsoil, ranged from 34 to 57 inches, but generally held to near 3 feet. The depth varied from 24 to 41 inches (taken from surface) but averaged about 30 inches. Pit No. 4 was floored with 60 broken and unbroken rocks completely covering the bottom of the pit. Intermingled with these rocks were many fragments of a single large pottery vessel. Pits Nos. 6 and 8 had been dug through a stratum of river-deposited gravel and rock, much of which had become mixed with the pit fill. This stratum began at a 24-inch level and continued through the walls and beyond the bottom of the excavation. Absence of this gravel in the other pits opened indicates that it is of limited or discontinuous occurrence and does not underlie the entire site.

The pits excavated generally revealed one point of difference from those on other aboriginal sites in this area in that there was

[1] Received April 11, 1946. The exploration of the Selden Island site was carried out wholly on week-end excursions by Mr. Stabler and the writer. We were accompanied on several occasions by Frank M. Setzler, Dr. T. D. Stewart, and Dr. Waldo R. Wedel, of the Department of Anthropology of the U. S. National Museum, who offered their assistance and trained experience in the excavation of the site and the preparation of this paper. The writer wishes to convey his gratitude also to Mr. Walker, who extended his fullest cooperation throughout the period of our explorations, and to Mr. Stabler for assistance and suggestions during excavation of the site and in subsequent analysis of data. The specimens from the site have been deposited in the U. S. National Museum.

very little difference in the consistency of the fill and that of the surrounding walls except for coloration and even this was not always sharply defined. The fill in each contained darkened soil, charcoal, and some flecks of burnt earth but was without exception very hard-packed.

There was no evidence in any of the pits of fire-baked walls, layers of ash, or concentrations of charcoal that might indicate use in cooking, pottery firing, etc. The layer of rocks found in the bottom of pit No. 4 might indicate its use as a storage pit, the rocks placed so as to protect the contents of the pit from excessive moisture which would tend to be greatest on the bottom. Whatever their original purpose, the pits were finally used as refuse depositories into which broken articles and rubbish from the nearby habitations were thrown indiscriminately at all levels.

There was no positive evidence of large concentrations of sherds and artifacts outside the immediate pit areas as one would expect to find in so-called "kitchen middens." However, occasional sherds and points were found near the bottom of the topsoil throughout the entire area excavated.

The table below summarizes pit measurements and contents.

POTTERY

Potsherds were much less abundant in the refuse pits of the Selden Island site than on any other village yet explored in the area; however, 431 sherds and 1 partially restorable vessel were recovered from the 12 pits and test trenches. Of this total 93+ per cent were tempered with coarsely ground steatite. The remaining sherds were tempered with very finely divided crystalline rock.

The closest known quarry of steatite is located just below Little Falls in Arlington County, Va., a distance of about 25 miles (Holmes, 1897, p. 124). The steatite particles comprising the tempering varied from 1 to 4 mm in diameter and were always used generously. Holmes (1903, p. 48) comments as follows on the use of steatite tempering: "In the piedmont region of North Carolina and Virginia vessels are found made of paste consisting of coarsely pulverized steatite and barely enough clay to hold the particles together." A coarse paste of this nature greatly affects the surface smoothness in weathered pieces. Those sherds not appreciably weathered have relatively smooth surfaces, but are occasionally pitted where particles of the tempering material have fallen out.

Sherds of both temper types characteristically have strongly weathered surfaces as if produced by poor methods of firing or by extended exposure to the action of soil acids and water. The sherds are generally soft in texture and will crumble readily if immersed in water before being thoroughly dried. Surface treatment of the body sherds was generally fine cord-roughening produced by a cord-wrapped paddle; the impressions may

Pit No.	Depth	Diameter	Sherds	Arrow-points	Worked steatite	Worked stone	Ax fragments	Organic material
	inches	*inches*						
1	31	39	25	0	0	25	1	1
2	26	44×50	34	1	1	12	0	1
3	26	36	74	2	0	16	0	0
4	31	36	100	3	0	7	0	0
5	24	34	12	2	0	4	0	0
6	27	36	43	5	0	4	0	0
7	28	38	20	0	0	2	0	0
8	41	57	46	3	1	8	0	0
9	25	39	34	6	1	8	0	1
10	39	42	3	3	1	14	0	0
11	26	36	14	0	0	7	1	0
12	24	48	2	3	0	14	0	0
Test trenches	—	—	24	2	0	9	0	0
Totals			431	30	4	130	2	3

be vertical, oblique, or crisscross (Fig. 1, *a–c, e, h*). In some steatite-tempered sherds net impressions occur; others have what appears to be the imprint of twined matting with heavy warps crossed by a fine tightly twisted cord weft at intervals of three-eighths to one-half inch. These latter impressions are strikingly similar to those described by Holmes (1903, p. 28, pl. 3) as occurring on "salt-pan ware" of the lower Mississippi Valley. All samples of grit-tempered sherds recovered from the pits were plain cord-roughened with no further elaborations.

Twenty-two steatite-tempered rims were found; there are none with crystalline tempering. The rim sherds in all cases are merely extensions of the body of the vessel and were either smoothed off on the lip, corded, or notched (Fig. 1, *a, b*).

Vessel shapes are very imperfectly known but our sample suggests that they varied in diameter from 11 to about 30 cm, as measured from projected arcs on restored fragments. The steatite-tempered vessels in some or most cases appear to have been flat-bottomed or nearly so (Fig. 1, *a*) and often bear heavy net or fabric impressions on their under surface. The angle formed by the body of the vessel and the bottom was in some cases about 90° but in others seems to have been less abrupt. In every case the vessel reached its maximum thickness at this point. Thickness of body sherds varied from 4 mm to 15 mm; the majority were between 5 and 9 mm.

Coloring was generally light brown throughout with varying darker shades produced by uneven firing.

Some steatite-tempered vessels had lug handles protruding for about 15–30 mm at right angles from the side of the bowl (Fig. 1, *i, j*). Presumably these vessels had two such grips below the rim. These lugs appear to be modeled closely from those found on large steatite bowls of this area for they were generally flat in appearance and tapered to blunt points. It is believed that the width and overall size of these lugs varied proportionately with the size of the vessel.

Two cases of holes in sherds, one being drilled after firing and the other thrust through the wall before firing, were found among our collection. An illustration of the latter type is shown in Fig. 1, *a*.

STONE ARTIFACTS

Stonework at the Selden Island site was not abundant. Thirty complete and broken projectile points (16 of which were classifiable as to shape) were recovered along with two grooved ax fragments, several pieces of worked steatite, and two rounded marble-size stones.

By comparison with collections of projectile points from other piedmont Potomac village sites, those from the Selden Island site appear unique only in the absence of triangular shapes. This type is found in all cases in greater abundance than stemmed points on all other sites yet explored in this area (Stearns, 1940, p.13; Manson, McCord, and Griffin, 1944, p. 399). Three of the 16 classified projectile points possessed rounded bases; all others were stemmed. The length of all types varied from 1 to 4 inches. The largest specimen was imperfect, and its size is a conservative estimate.

The stones most generally used for the manufacture of projectile points were native to the vicinity and include quartz, quartzite, and rhyolite (Holmes, 1897, p. 73, describes rhyolite quarries at Maria Furnace, Pa.). In general, the quality of chipping was good. The points compare favorably with those of similar material from other sites. A few flakes of chert were found, but this stone was not represented in any of the points; its lesser use may have been due to the scarcity of the material.

As previously mentioned, two fragments of grooved stone axes were found on the site: a fragment of one side broken at the top of the groove and at 1½ inches below the groove, from pit No. 1, and the other, a section of one side from half an inch above the groove to the bit, from pit No. 11. Presumably the groove completely encircled the implement in both cases, as indicated by surface finds from other sites of this culture. The fragment from pit No. 1 was fashioned from an igenous rock (greenstone) and was much weathered. The other specimen was shaped from Triassic sandstone and was

FIG. 1.—Potsherds and chipped projectile points from Selden Island, Montgomery County, Md. Height of *a*, 120 mm; width of *b*, 125 mm.

similarly weathered. Stearns (1940) in his report on the Hughes site and Manson, McCord, and Griffin (1944) in their report on the Keyser site do not mention grooved axes but note that celts are characteristic of both sites. The writer's personal experience in excavating Indian villages of the piedmont Potomac area agrees with their findings in regard to the occurrence of celts and the nonoccurrence of grooved axes on all sites explored other than the type here discussed. There is no trace of celts in our collections from this excavation.

One steatite bowl fragment, half an inch thick, was found in pit No. 10. This was a section from the junction of the side and bottom. It is impossible to determine the size and exact shape of the bowl from this sample, but the bottom of the vessel appears to have been flat; the sides approach it at about 115°, giving the effect of a rather sharp angle on the outside surface and a curving radius of about 2½ inches on the inside surface. This was obtained by thickening the vessel at the radius to three-quarters of an inch. The vessel plainly shows marks of aboriginal tools used in the shaping process. Finer tools were used on the inside of the bowl than on the outside, as illustrated by the scratches and gouges occurring on each surface. Several odd pieces of steatite were found in the pits and they are believed to have been brought to the site for use in pottery tempering but were never pulverized for this purpose.

The two marble-sized stones, one 20 mm in diameter and the other 26 mm, were found in separate excavations. The former was found in pit No. 3 and the latter elsewhere while testing. These stones appear to have been shaped by pecking, but their use is again speculation. They may have been for gaming.

Many flakes of quartz, quartzite, and rhyolite and a number of rejects and blanks were found in the pits. There were also a number of flakes and one crude point of limestone, all much weathered. Several pieces of worked Triassic sandstone and two nodules of a coarse conglomerate were found in the excavations. It is thought that this latter stone was used for tempering the grit-tempered sherds found here in a minority proportion.

ORGANIC MATERIALS

The only trace of organic material aside from charred wood found in the excavations consisted of two completely carbonized hickory nut shells, which were probably part of the inhabitants' diet.

BONE MATERIALS

One of the puzzling aspects of the site is the utter lack of worked or unworked human or animal bones in the refuse pits. No single sample large enough to identify has been found in any of the excavations. The only traces were very small bits of bone, none of which equaled the size of one's smallest fingernail. Even these tiny fragments were so fragile that they could rarely withstand separation from the soil that surrounded them. Two or three pieces showed signs of fire and consequently were in a somewhat better preserved state. In each pit excavated it was noticed that many hard-packed molds with considerably darker soil in their interiors existed throughout the fill. This suggests that something had at one time occupied these molds and had now completely decayed.

Bone of both animal and human is found in a comparatively good state of preservation on all other excavated sites not of this culture in the Potomac area. It is true that the mold marks may represent other organic compounds more readily affected by decay and that these aborigines possibly did not place animal bones in their refuse pits. This would certainly be contrary to the practices of all locally known woodland cultures. It might be that this soil is particularly acid and would dissolve bone structure more readily, but unless a much longer period of time is involved this is contradicted by the existence of the two other aboriginal village sites on this same island and presumably in the same soil structure. In both of these sites bone material is well preserved.

CONCLUSIONS

There are very few detailed descriptive reports dealing with particular sites along the Potomac above the District of Columbia. In the light of intermittent surveys and a rather considerable body of information derived therefrom, however, it appears that

the Selden Island site discussed herein represents a heretofore virtually unknown cultural horizon. The occurrence of steatite-tempered earthenware has long been known but the archeological complex of which it was characteristic has been unidentified.

Stearns's report (1940) on the Hughes site and Manson, McCord, and Griffin's report (1944) on the Keyser site describe Potomac Valley pottery assemblages in which shell-tempered ware predominates. Vessels are described as having wide mouths and rounded bottoms; several have loop handles or applique lugs below a modified rim which is often deeply notched with a cord-wrapped stick. In a minority proportion from each site are grit-tempered sherds which do not have lugs or handles but characteristically have collared rims and conical bottoms. This ware was found by the writer to predominate on several village sites in the immediate neighborhood of Selden Island. A third ware found at the Keyser site, designated "Potomac Creek Cord Impressed," is described as grit-tempered and conical-bottomed but not possessing collared rims, lugs, or handles (see also Stewart, 1939). In all these wares the application of a cord-wrapped paddle to the outer body surface is characteristic.

Steatite-tempered vessels from Selden Island appear to have had flat, or nearly flat, bottoms and plain unornamented rims, which were characterized by merely extending the cord roughening from the body of the vessel to the lip. The notched lip noted in shell-tempered ware appears to have been applied with a rather wide cord-wrapped stick while the notches on Selden Island pottery are a series of small indentations possibly applied with a very small bare stick or twig. The wide, flat lugs appearing on the sides of some steatite-tempered vessels differ greatly from the more expertly fashioned loop handles or rounded lugs appearing on shell-tempered ware. The steatite-tempered Selden Island sherds are generally easily distinguished from the more common shell- and grit-tempered wares on other sites of the Potomac Valley.

The absence of triangular arrowpoints and the presence of grooved axes instead of celts on the Selden Island site further distinguish this complex from others previously reported in the area.

The absence of sizable bone fragments in the refuse pits is contrary to findings at other Potomac Valley sites, and suggests greater antiquity rather than different habits of diet or methods of refuse disposal.

The extreme hardness of the pit fill and the eroded condition of some of the specimens seem to point similarly to a rather considerable antiquity.

On present evidence, the Selden Island site under consideration is certainly prehistoric. Though stratigraphic evidence is lacking, it appears to antedate the shell-tempered pottery horizon represented at the Hughes and Keyser sites. I suspect that it also antedates the known local grit-tempered wares, and may even represent the oldest pottery horizon in the locality. Until further excavations have been made at this and other related sites widely distributed throughout the Potomac piedmont area, the relationships of the complex must remain obscure. As to the people who were its authors, the complete lack of any skeletal material leaves their physical relationships unknown.

LITERATURE CITED

HOLMES, W. H. *Stone implements of the Potomac Chesapeake Tidewater Province.* Bur. Ethnol. 15th Ann. Rep. Washington, 1897.

———. *Aboriginal pottery of the eastern United States.* Bur. Amer. Ethnol. 20th Ann. Rep. Washington, 1903.

MANSON, CARL, HOWARD A. MCCORD, and JAMES B. GRIFFIN. *The culture of the Keyser farm site.* Pap. Michigan Acad. Sci., Arts and Lett. 29: 375–418. 1944.

STEARNS, RICHARD E. *The Hughes Site: An Aboriginal village site on the Potomac River in Montgomery County, Maryland.* Proc. Nat. Hist. Soc. Maryland No. 6, Baltimore, 1940.

STEWART, T. DALE. *Excavating the Indian Village of Patawomeke (Potomac).* Explorations and Field-work of the Smithsonian Institution in 1938: 87–90. Washington, 1939.

———. *Further excavations at the Indian Village of Patawomeke.* Explorations and Field-work of the Smithsonian Institution in 1939: 79–82. Washington, 1940.

ENTOMOLOGY.—*Species of beetles of the genus* Lactica *from the West Indies closely related to* L. tibialis (Olivier).[1]

DORIS H. BLAKE. (Communicated by ALAN STONE.)

Olivier described *Altica tibialis* from a specimen in the Bosc collection from near Charleston, S. C. There are a great many pale yellow species of *Lactica* very similar in coloration to *tibialis* that occur in Mexico, Central and South America, and also in the West Indies. The purpose of this paper is to draw attention to some of the West Indian species, at least one of which has been confused with *tibialis*. All these species, although very closely related, do show distinct differences in coloration, shape, and also in the internal structure of the genitalia. Most of the species here dealt with are from the Bahamas and Cuba. One from Dominica, which is a little more striking in its differences, is also included. No doubt more species from other islands of the West Indies will come to light in the course of time.

Lactica tibialis (Olivier)

FIGS. 2, 4

Altica tibialis Olivier, Ent. **6**: 702. 1808.
Altica ocreata Say, New Species found by Baradino in Louisiana: 7. New Harmony, 1832.
Monomacra tibialis DeJean Catalogue: 413. 1837.
Lactica tibialis Baly (not Olivier), H. Clark, Journ. Ent. 1(6): 458. 1862.
Lactica tibialis Harold, Col. Hefte **13**: 90. 1875.

Lactica tibialis is represented in the U. S. National Museum collection by specimens from North and South Carolina, Georgia, Tennessee, Louisiana, Texas, Arkansas, and Missouri, and one is labeled Michigan. There are three specimens from Brownsville, Tex., that have a paler coloration. Instead of having entirely dark tibiae and tarsi, the tibiae in two of these are darkened only along the outer edge, and in the third specimen only the apices of the femora, tibiae, and tarsi are slightly darker. The aedeagus seems to have a sharper and narrower tip, although of the same shape. Possibly this is a southern race, but from the little material at hand I hesitate to make more than a mention of the differences.

[1] Received March 14, 1946.

Lactica religata (Jacq. du Val)

FIG. 1

Monomacra religata Jacq. du Val, Hist. phys. Cuba, Ins. **7**: 311. 1856; Suffrian, Arch. für Naturg. **34**: 193. 1868.
Lactica tibialis Gemminger and Harold, Catalogue **12**: 3499. 1876 (not *tibialis* Olivier).

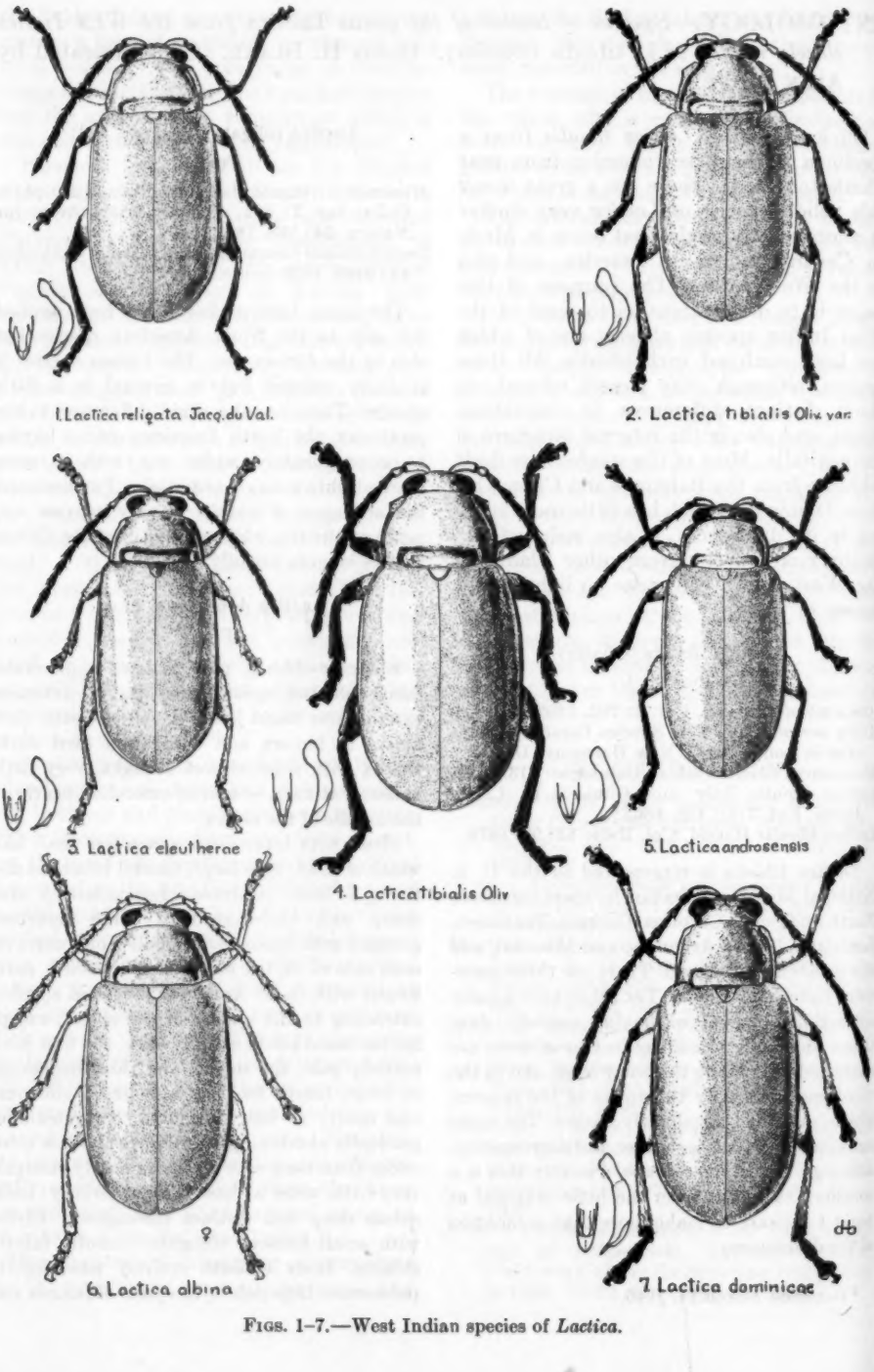
The name *Lactica tibialis* has been applied not only to the North American species but also to the Cuban one. The Cuban species is similarly colored but in general is a little smaller. There are also slight differences in the prothorax, the North American species having a proportionately wider one with a more marked obtuse angle anteriorly. Furthermore, the aedeagus of *tibialis* is very narrow and acute at the tip, whereas the tip of the Cuban species is more broadly rounded.

Lactica dominicae, n. sp.

FIG. 7

Elongate-oblong, pale yellow, impunctate, faintly shining, mouth parts darker, antennae except three basal joints dark, legs with dark apices to femora and tibiae and tarsi dark; thorax with sides almost straight, very little widened at base, antennae extending nearly to the middle of the elytra.

Head with interocular space less than half width of head; eyes large; frontal tubercles distinct, a little produced; interantennal area sharp and keel-shaped, a large puncture grouped with two or more smaller punctures on each side of vertex near the eye; mouth parts tinged with dark. Antennae long and slender, extending to the middle of the elytra, except for the basal joints entirely dark, the first joint entirely pale, the second and third deepening in color; fourth longest, 5, 6, and 7 subequal and nearly as long as fourth, the remainder gradually shortening. Prothorax about a third wider than long with the sides nearly straight, very little wider at base than anteriorly; basal sulcus deep and distinct throughout. Elytra with small humeri, elongate, smooth, faintly shining. Body beneath entirely pale, lightly pubescent. Legs pale with apices of femora and



FIGS. 1–7.—West Indian species of *Lactica*.

tibiae and tarsi dark. Length 4 mm; width 2 mm.

Type male, U.S.N.M. No. 57877.

Type locality.—Saltoun Estate, 800 feet altitude, Dominica, B.W.I., collected June 30, 1941, by R. G. Fennah.

Remarks.—The distinguishing character of this species is the thorax with its nearly straight sides, and also the unusually long antennae.

Lactica eleutherae, n. sp.

FIG. 3

Elongate-oblong, shining, pale yellow with dark antennae. Basal sulcus on thorax deeply impressed.

Head with interocular space approximately half width of head, frontal tubercles distinct with a depression on each side of them on the vertex, a deep puncture also near the eye; interantennal area not produced but flat; head entirely pale. Antennae with the three basal joints pale, remainder dark and subequal, not reaching the middle of the elytra. Prothorax almost twice as wide as long with slightly rounded sides, a little broader at the base; a deeply impressed basal sulcus. Elytra shining, impunctate, smooth, with small humeri. Body beneath entirely pale, shining, lightly pubescent. Legs pale. Length 3.2–3.4 mm; width 1.5 mm.

Type male and one paratype, also male, U.S.N.M. No. 57878.

Type locality.—Eleuthera Island, Bahamas, collected by H. F. Wickham July 9–15.

Remarks.—This species differs from the Cuban one by having entirely pale legs. It is also more highly polished and has a more deeply impressed basal sulcus on the prothorax.

Lactica albina, n. sp.

FIG. 6

Elongate-oblong, impunctate, faintly shining, entirely pale yellow without dark markings on legs or antennae.

Head with interocular space approximately half width of head; frontal tubercles rather flat and indistinct, interantennal area not sharply keeled but flat, very little produced; a large puncture on each side of vertex near eye; entirely pale. Antennae not extending to the middle of the elytra, entirely pale, fourth and fifth joints subequal and a little longer than the remainder, all joints subequal. Prothorax more than a third wider than long with slightly rounded sides, broadening a little towards base; basal sulcus clearly marked. Elytra smooth, impunctate, faintly shining, humeri small. Body beneath pale, shining, nearly glabrous. Legs entirely pale. Length 3.9 mm; width 1.8 mm.

Type female, U.S.N.M. No. 57879.

Type locality.—Egg Island, Bahamas, collected on May 13 by H. F. Wickham.

Remarks.—This is the only species of the group from the West Indies that is entirely pale. Unfortunately, no male has been examined.

Lactica androsensis, n. sp.

FIG. 5

Elongate-oblong, shining, impunctate, pale yellow with all except the basal joint of the antennae dark, apex of femora, tibiae, and tarsi dark.

Head with interocular space approximately half its width, polished pale yellow with mouth parts tending to be darker; frontal tubercles with a depression between and on either side of them; interantennal area flat, the usual large puncture near the eye. Antennae not extending to the middle of the elytra, all but the basal joint dark, joints 4–11 subequal. Prothorax not quite twice as broad as long, with sides slightly arcuate, a little wider at base; basal sulcus clearly marked. Elytra smooth, pale, polished, humeral prominences small. Body beneath entirely pale and lightly pubescent. Legs with the apex of the femora, and the tibiae and tarsi dark. Length 3.2–3.7 mm; width 1.6–1.7 mm.

Type male (M.C.Z. No. 27374) and 2 paratypes (1 in U.S.N.M. No. 57880).

Type locality.—Andros Island, Bahamas, collected Aug. 1–10, 1904 by Barber (? Thomas Barbour).

Remarks.—In coloration this is very much like the Cuban species and *tibialis*, although the femora are darkened only at the tip, whereas in the other two the dark extends farther back. The aedeagus is different from either.

ENTOMOLOGY.—*The* Aedes (Finlaya) niveus *subgroup of Oriental mosquitoes.*[1]

KENNETH L. KNIGHT, Lt. Comdr., H(S), U.S.N.R.[2] (Communicated by ALAN STONE.)

By Edwards's[3] classification, those mosquitoes in the subgenus *Finlaya* with dark hind tarsi (including *unicinctus* Edwards, which has the first segment basally banded) are all included in what he terms "Group H." A distinct section of this group is represented by *niveus* (Ludlow) and is characterized by having at least the anterior two-thirds of the scutum covered with white scales (may be more or less divided medially in the fe nale; in *idjenensis* Brug the light-colored scutal scales are pale golden) and by lacking femoral knee spots. At present there are seven species described in the *niveus* subgroup. Of these, specimens of *albolateralis* (Theobald) (male only), *niveus* (Ludlow), and *novoniveus* Barrand (male only) have been examined by the author. For comparison with *idjenensis* Brug, *pseudoniveus* (Theobald) (Borneo, Singapore, Sumatra), *niveoides* Barrand (India, Indo-China, Sumatra, Java), and *alboniveus* Barrand (Java, eastern Himalayas), the literature descriptions were utilized. Larvae of only *niveus* were seen.

In this paper four new species are described; and the possibility of a literature description of *niveus* being a new species is pointed out.

KEY TO FEMALES OF THE NIVEUS SUBGROUP

1. A patch of broad white scales on *ppn*.....2
   No broad white scales on *ppn*.....3
2. Light-scaled scutal areas pale golden.....
   .....*idjenensis* Brug
   Light-scaled scutal areas white. *niveus* of Feng[4]
3. A silvery spot in middle of anterior surface of midfemur.....*pseudoniveus* (Theobald)
   No silvery spot in middle of anterior surface of midfemur (however, there may be a median elongate pale marking ventrally on anterior surface).....4
4. Extent of apical dark area of hind femur greatly reduced laterally, incomplete or nearly so ventrally; midfemur largely pale on posterior surface.....5
   Apical dark area occupies one-fourth or more of hind femur, lateral and ventral extent little or not reduced.....6
5. White scales present along margins of prescutellar bare space; apical dark area of hind femur broken ventrally.....*saperoi*, n. sp.
   No white scales present around prescutellar bare space; apical dark area of hind femur usually thinly connected ventrally.....
   .....*dorseyi*, n. sp.
6. Scutal white scaled area not extending to lateral margin over most of paratergite; lateral white scaled areas may be broadly connected anteriorly.....*laoagensis*, n. sp.
   Scutal white scaled area extending along lateral margin to wing base, or at least to level of prealar region.....7
7. Scutal white scaled area not broken medially, posterior margin may be slightly concave
   .....*niveus* (Ludlow)
   niveoides Barraud
   novoniveus Barraud[5]
   alboniveus Barraud
   Scutal white scaled area broken by a broad longitudinal median band of dark scales, frequently a line of connecting scales anteriorly
  8
8. White scales present along margins of prescutellar bare space; midfemur extensively pale posteriorly, and usually with some ventral pale scaling on the anterior aspect.....
   .....*albolateralis* (Theobald)
   No white scales present around prescutellar bare space; midfemur dark, a few ventrobasal pale scales on posterior surface.....
   .....*lacteus*, n. sp

KEY TO THE NIVEUS SUBGROUP BASED ON MALE GENITALIA[6]

1. Sclerotized ridge on dorsal (before rotation) inner basal surface of basistyle with an apical

[1] Received May 2, 1946. The collections reported on here were made under the auspices of U. S. Naval Medical Research Unit no. 2. The material was worked up in space furnished by the Division of Insects, U. S. National Museum. Additional specimens were made available from the museum collections through the courtesy of Dr. Alan Stone.

[2] Research Division, Bureau of Medicine and Surgery, U. S. Navy Department.

[3] EDWARDS, F. W. *Genera insectorum. Culicidae*, fasc. 173: 154. Brussels, 1932.

[4] *Aedes* (*Finlaya*) *niveus* Ludlow. FENG, L., *The tree hole species of mosquitoes of Peiping, China.* Chinese Med. Journ., Suppl. 2: 512. 1938. This is apparently a previously undescribed species.

[5] According to Barraud (*Fauna of British India, Diptera*, 5: 205. 1934) the females of these species are indistinguishable.

[6] The males of *pseudoniveus* and *idjenensis* are undescribed. The male genitalia of Feng's *niveus* are not sufficiently described to be placed in this key.

elbowed spine and a lateral stout hair..... .....*alboniveus* Barraud
This ridge without an apical elbowed spine..2
2. Dorsal basal portion of basistyle with a clump of specialized scales (to be distinguished from normal abdominal type scales).....3
Dorsal basal portion of basistyle with a clump of long setae, none of them striated (one specimen of *saperoi* had 2 setae striated)..7
3. Inner dorsal area of basistyle with a broad band of uniform (except apically) stiff short setae.....4
Inner dorsal area of basistyle with a row of stiff bent setae on inner margin, a few smaller setae behind these.....6
4. Dorsal basal scale clump of basistyle with some of scales very broad, others slender and elongate (Fig. 2); claspette blade distinctly enlarged medially, enlarged portion clear (Fig. 10).....*lacteus*, n. sp.
Dorsal basal scale clump of basistyle with scales setiform; claspette blade evenly and only slightly swollen to middle, of uniform texture.....5
5. Inner dorsal area of basistyle with short stiff setae extending laterally to longer lateral setae (Fig. 5).....*niveus* (Ludlow)
Inner dorsal area of basistyle with a band of short stiff setae on inner margin, a bare area present between these and longer lateral setae (Fig. 4).....*dorseyi*, n. sp.
6. Dorsal basal scale clump of basistyle with scales of several different lengths, shorter ones obovate (Fig. 6); claspette blade distinctly widened medially, enlarged portion clear (Fig. 8).....*albolateralis* (Theobald)
Dorsal basal scale clump with scales narrow, elongate and most of them of rather uniform length (Fig. 3); claspette blade only slightly swollen medially, of uniform texture (Fig. 12).....*laoagensis*, n. sp.
7. Blade of claspette widening only slightly to the middle, of uniform texture.*nivecides* Barraud
Blade of claspette noticeably enlarged medially 8
8. Inner dorsal area of basistyle largely free of setae medially (Fig. 1); appendage of dististyle over three-fourths as long as dististyle.....*saperoi*, n. sp.
Inner dorsal area of basistyle rather uniformly covered with short bent setae; appendage of dististyle approximately one-half length of dististyle.....*novoniveus* Barrand

KEY TO THE LARVAE OF THE NIVEUS SUBGROUP[7]

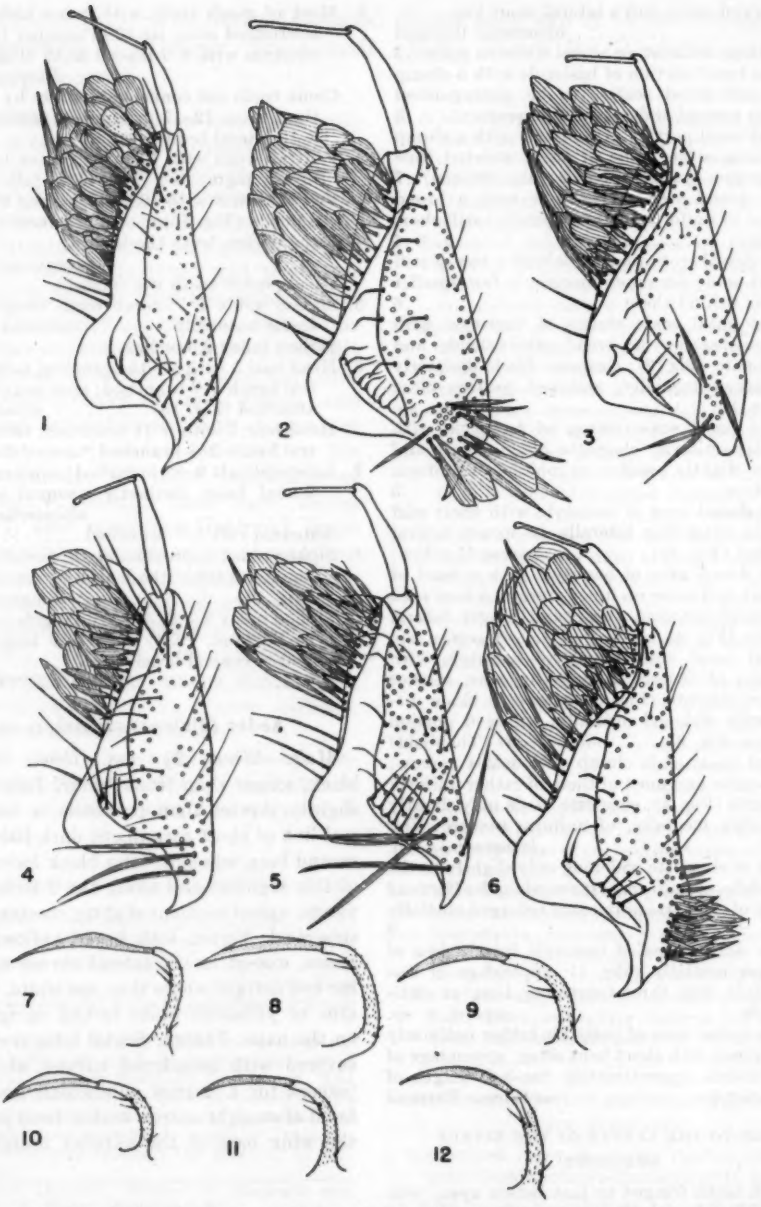
1. Comb teeth fringed to just before apex; ventral brush with 10 or more tufts.....2
Comb teeth not fringed beyond middle; ventral brush with 8 tufts.....4
2. Most of comb teeth with bases united by a sclerotized area, 10–12 in number (Fig. 17); mentum with 6–7 lateral teeth (Fig. 20)... .....*dorseyi*, n. sp.
Comb teeth not connected basally by a sclerotized area, 12–17 in number; mentum with 8–10 lateral teeth.....3
3. Ventral brush with 12 tufts; pecten teeth uniformly pigmented (Fig. 15)...*lacteus*, n. sp.
Ventral brush with 10 tufts; pecten teeth pale apically (Fig. 16).....*niveus* (Ludlow)
4. Basal pecten teeth the largest..... .....*novoniveus* Barraud
Basal pecten teeth the smallest.....5
5. Siphon index 4–5; comb teeth fringed at extreme base only.....*niveoides* Barraud
Siphon index 3.5 or less.....6
6. Head hair 5 with 10–16 branches; tufts of ventral brush 4–7 branched; acus usually thinly attached (Fig. 13).....*saperoi*, n. sp.
Head hair 5 with 5–11 branches; tufts of ventral brush 2–4 branched;[8] acus detached..7
7. Antennal tuft 9–12 branched; subterminal antennal hairs distinctly unequal in length .....*alboniveus* Barraud
Antennal tuft 5–7 branched.....8
8. Siphon index approximately 2; dorsal anal gills about 1.5 times the length of the anal plate (Fig. 14).....*laoagensis*, n. sp.
Siphon index 3–3.5; dorsal anal gills (according to Barraud, 1934) about the length of the longer ventral brush hairs..... .....*albolateralis* (Theobald)

[7] The larvae of *pseudoniveus* and *idjenensis* are undescribed. The larva of Feng's *niveus* can not be taken beyond point 6 in the key, because of the inadequacy of the description. However, it is described as having the dorsal anal gills approximately equal to the anal plate in length. This would separate it from the remaining species.

[8] There are conflicting literature descriptions on this point for *alboniveus;* this is also true of the number of tufts in the ventral brush.

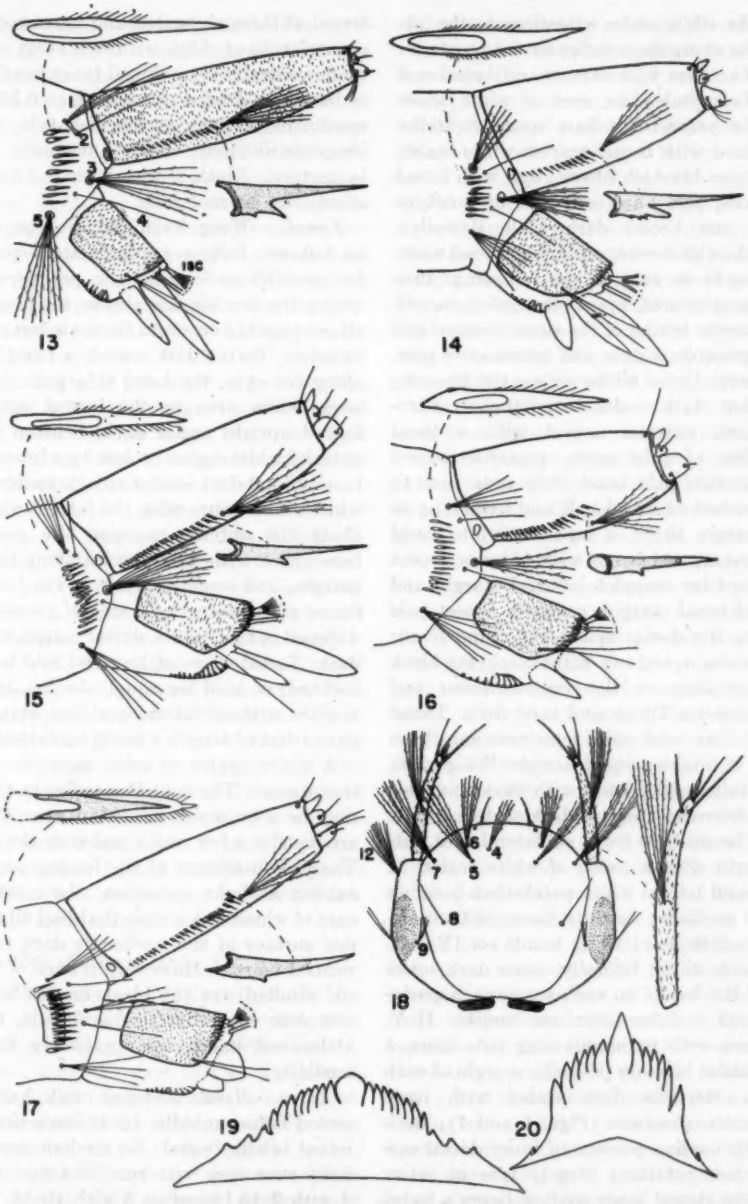
Aedes (Finlaya) saperoi, n. sp.

Male.—Wing: 2½ mm. *Head:* Proboscis black, longer than front femur. Palpus black, slightly shorter than proboscis, a mesal ventral line of short recumbent dark hairs on the second long segment, long black hairs at apex of this segment and along the 2 terminal segments, apical segment slightly shorter than the subapical. Vertex with broad yellowish-white scales, except in the lateral corner and along the eye margin where they are white, a narrow area of yellowish-white forked upright scales on the nape. *Thorax:* Scutal integument dark; covered with broadened curved white scales (except for a narrow submedian longitudinal band of straight narrow scales) from just before the wing base of the anterior margin of the



FIGS. 1–6.—Inner dorsal aspect of dissected basistyle of male genitalia of *Aedes* (*Finlaya*) (setal rings indicate location of omitted setae): 1, *A. saperoi;* 2. *A. lacteus;* 3. *A. laoagensis;* 4, *A. dorseyi;* 5. *A. niveus;* 6, *A. albolateralis.*

FIGS. 7–12.—Lateral aspect of dissected claspette: 7, *A. saperoi;* 8, *A. albolateralis;* 9, *A. niveus;* 10, *A. lucteus;* 11, *A. dorseyi;* 12, *A. laoagensis.*



FIGS. 13–17.—Lateral aspect of larval terminal segments of *Aedes* (*Finlaya*) (ventral brush omitted): 13, *A. saperoi;* 14, *A. laoagensis;* 15, *A. lacteus;* 16, *A. niveus;* 17, *A. dorseyi.*
FIG. 18.— Dorsal aspect of larval head, *A. dorseyi.*
FIGS. 19, 20.—Dorsal aspect of the mentum: 19, *A. saperoi;* 20, *A. dorseyi.*

scutum, the white scales extending to the lateral margin along their entire extent; posterior portion of scutum with narrow and broadened curved black scales, an area of white scales around the prescutellar bare space. Scutellar lobes clothed with broad grayish-white scales. *Apn* and *ppn* blackish brown, *apn* with broad white scales, *ppn* bare (one side of holotype possesses one broad dark scale dorsally). Pleuron blackish brown, a patch of broad white scales present on each of the following: Propleuron, prealar area, upper sternopleuron, and lower posterior border of the sternopleuron and the mesepimeron. Coxae and trochanters pale, covered with broad white scales, the forecoxa with a few dark scales intermingled. Forefemur dark, anterior aspect with a basal ventral line of pale scales, posterior aspect with a median pale band from near base to apex, broadest on basal half and extending to dorsal margin there, a separate white basal patch present; mid femur with anterior aspect dark except for complete ventral margin and the dorsal basal margin, posterior aspect pale except for the dorsal apical half; hind femur creamy white, apical two-fifths black, the black area incomplete on the ventroanterior and ventral aspects. Tibiae and tarsi dark. Tarsal claws of fore and mid legs unequal, both toothed; of hind leg equal, simple. Wings dark scaled. Halter pale, knob with dark and pale scales. *Abdomen:* Tergites dark scaled; tergite I with a broad bare hairy sublateral area, lateral margin with a patch of white scales; II with a basal lateral white patch that becomes subbasal medially, broadly incomplete medially; complete basal white bands on IV–VII, these bands widest laterally, some dark scales basad of the bands on each segment; a posterior lateral scaleless area on tergites II–V, these areas with numerous long pale hairs, a line of similar hairs on posterior margin of each segment. Sternites dark scaled with basal white bands. *Genitalia* (Figs. 1 and 7): Basistyle with median portion of inner dorsal surface (before rotation) largely free of setae; basally the dorsal inner surface bears a patch of elongate thickened setae (under high power, fine striae are apparently present on 2 of these in the holotype, indicating that they are possibly scales; this was not noted in the other specimens); a patch of broad dusky scales on the inner ventral margin, 2–3 of the more external of these elongated and narrowed; a narrow sclerotized ridge with 4–5 stout setae extends ventrally from dorsal inner basal margin of basistyle. Dististyle appendage 0.76–0.83 (3 specimens) as long as the dististyle. Blade of claspette distinctly widened medially, uniform in texture. Ninth tergite with 1–3 broadened stout setae on each lobe.

Female.—Wing: 3 mm. Differs from the male as follows: Palpus approximately one-fourth to one-fifth as long as the proboscis. Torus with a few fine black scales on the inner aspect (these possibly occur on the male but could not be seen). Vertex dark scaled, a band of white along the eyes, the band enlarged medially, a large white area in the lateral corner, the forked upright scales dark. Scutum with the anterior white region broken by a broad median longitudinal dark scaled area, a narrow area of white scales connecting the lateral white areas along the anterior margin, the prescutellar bare space with white scales along the lateral margins and sometimes across the front. Midfemur with ventral pale area of anterior aspect widened in the middle, dorsal margin may be all dark. Tarsal claws of fore and mid legs equal, toothed; of hind leg equal, simple. Abdominal tergites without lateral scaleless areas on tergites (that of tergite I being sublateral).

A slight degree of color variation occurs in this species. The scutellar scales in the female may be a brownish gray, but even then there are usually a few white scales on the mid lobe. The pale markings of the femora occasionally exhibit a slight reduction, the most striking case of which was a male that had all the posterior surface of the midfemur dark except the ventral margin. However, in none of the material studied was the black on the hind femur complete ventrally. In one female, the dorsal abdominal bands were narrowly interrupted medially.

Larva.—Head: Antenna with hair tuft inserted before middle, 10–17-branched; subterminal bristles equal. No median mouth brush hairs were seen with comblike tips. Head hair 4 with 9–15 branches, 5 with 10–16, 6 with 7–15, 7 with 9–15, 8 with 2–3, 9 with 5–8, 12 with 18–25. Mentum (Fig. 19) with 10–11 lateral teeth. *Abdomen* (Fig. 13): Some of the hairs thinly stellate in type. Lateral hairs of segments I–VI with 2 branches. Pentad hair 1 with 3–6 branches, 3 with 7–8 (one specimen

with 11), 5 with 6–7. Comb teeth 8–12 in number, with fine lateral basal fringe that extends just onto the shaft. Siphon with surface roughened by interrupted transverse striations; index 3–3.5; acus usually thinly attached; hair-tuft 5–9 branched; 14–24 pecten teeth, basal teeth the smallest, evenly pigmented (occasionally apical teeth are seen with paler tips), a stout lateral denticle, 1–3 minute spines frequently present basally; length of apico-dorsal hair less than one-half the width of the siphon apex. Anal plate with a patch of minute laterocaudal spinules, lateral hair 2–5 branched, *isc* 3–5. Ventral brush with 8 tufts, each tuft 4–7 branched. Anal gills tapered to a rounded tip, dorsal pair 1.4–2.0 times longer than the ventral pair and 1.3–1.7 times longer than the anal plate (in one specimen, the dorsal gills were slightly shorter than the anal plate).

Types.—Holotype: Male, with larval and pupal skins, and dissected genitalia (U.S.N.M. No. 57919), Subic Bay, Luzón, Philippines, June 27, 1945 (F. E. Zedeck and E. S. Zolik), reared from a bamboo stump. *Paratypes* (4 males, 6 females, all from Subic Bay, Luzón): 5 females with associated larval and pupal skins, 2 males without associations, same data as for holotype; 1 male and 2 females, July 7, 1945 (M. J. MacMillan), reared from a tree hole; 1 male and 1 female, August 13, 1945 (L. A. Rozeboom and M. J. MacMillan), reared from bamboo stump. Paratypes deposited in U. S. National Museum and British Museum.

This species is dedicated to Capt. J. J. Sapero (MC) USN, whose cooperation has done much to further Pacific mosquito studies.

Aedes (Finlaya) lacteus, n. sp.

Male.—Wing: 2½ mm. Differs from the description of *saperoi* as follows: Vertex with broad dark scales (appear paler in some lights), pale scales along the eyes and in the lateral corner, the upright forked scales dark. Scutum with no pale scales around the prescutellar bare space. Scutellar lobes clothed with broad, dark-brown scales. Forefemur dark anteriorly, posterior aspect with a broad median pale band on basal half; midfemur all dark except for a few ventrobasal pale scales on the posterior aspect; hind femur white, a few basal dark scales, about apical two-fifths completely dark scaled. Halter with knob dark scaled. *Genitalia* (Figs. 2 and 10): Inner dorsal margin of basistyle with a broad band of uniform short stout curved setae, the area immediately external to this band free of setae; basally the dorsal inner surface bears a clump of narrow acutely tapered scales, immediately basad to these is a transverse line of 6 very broad scales and a clump of about 6 elongate mixed slender and broad scales, the slender ones being acutely tapered and longer than the broad scales; the sclerotized ridge on the dorsal inner basal margin of the basistyle with 10–12 stout setae. Dististyle appendage 0.73 as long as the dististyle. Blade of claspette distinctly enlarged medially, the enlarged portion being clear. Ninth tergite with 3 bristles on each lobe.

Female.—Wing: 3 mm. Differs from the female description of *saperoi* as follows: Palpus very small, approximately one-eighth as long as the proboscis. Scutum with the broad median band of dark scales extended to anterior margin, the 2 lateral white-scaled areas not connected, no white scales around the prescutellar bare space. Scutellar lobes covered with broad dark scales. Forefemur dark anteriorly, posterior aspect with a broad median pale band on basal half; midfemur dark, a few ventrobasal pale scales on the posterior aspect; hind femur white, a few basal dark scales, about apical one-third all dark. Halteres with knob dark scaled. Abdominal tergites without complete bands (possibly some shrinkage has occurred).

Larva.—Head: Antennal shaft with hair tuft just before middle, 6–8-branched; subterminal bristles distinctly subequal. Median mouthbrush hairs with comblike tips. Head hair 4 with 9–13 branches, 5 with 9–11, 6 with 8–9, 7 with 10–12, 8 with 1–2, 9 with 2–4, 12 with 6–8 (main branches only). Mentum with 9–10 lateral teeth. *Abdomen* (Fig. 15): No stellate hairs. Dorsolateral hair of I with about 6 branches, the lateral hair with 2; lateral hair of II with 5–6; of III–VI with 2. Pentad hair 1 with about 5 branches, 3 with 8–10, 5 with 5–7. Comb teeth 13–17 in number, broadened, finely fringed to just before apex. Siphon dark with apical fifth pale; smooth; index about 3; small detached acus; hair tuft 11-branched; 20–24 very dark slender pecten teeth, basal teeth the smallest, evenly pigmented, a stout lateral denticle; length of apicodorsal hair nearly equal to width of siphon apex. Anal plate with a prominent patch of laterocaudal spines, lateral hair 1–2-branched, *isc* 8–10.

Ventral brush with 12 tufts, each tuft 6–14-branched. Anal gills somewhat lanceolate, dorsal pair 1.8–2.3 times longer than the ventral pair and about 1.2 times longer than the anal plate.

Types.—Holotype: Male, with dissected genitalia (U.S.N.M. No. 57920), Cape Melville, Balabac Island, Philippines, June 1945 (Jean L. Laffoon and D. R. Johnson), reared from a tree hole. *Paratypes:* 1 female, 2 larvae, same data as for holotype. Deposited in U. S. National Museum.

Discussion.—A female specimen in the U. S. National Museum from Parang, Mindanao (J. H. Paullus), is possibly this species, but in the absence of a male positive identification is not possible.

Aedes (Finlaya) laoagensis, n. sp.

Male.—Wing: 2–2.5 mm. Differs from the description of *saperoi* as follows: Vertex dusky medially, remainder pale, upright forked scales dark. Scutum with only a very few pale scales along the prescutellar bare space (this area rubbed in holotype). Scutellar lobes all dark scaled. Forefemur dark, with a median pale area on the posterior basal half, the pale area reaching the dorsal margin basally; midfemur dark, with a small ventral line of pale scales extending from near base to just beyond middle on posterior aspect; hind femur white with about apical one-third dark. Halter knob dark scaled. Although the holotype has the abdominal tergites banded as in *saperoi*, the male from Baguio has them incomplete on at least the first six segments. *Genitalia* (Figs. 3 and 12): Basistyle with a line of short stiff curved setae along inner dorsal margin, followed laterally by a line of thinner setae, a bare area between these and the setae of the lateral margin; basally the dorsal inner surface bears a clump of elongate narrowly lanceolate scales (the male from Baguio has a few of the scales noticeably shorter than the others but not differently shaped; this area in the holotype appears to have lost some scales); the sclerotized ridge on the dorsal inner basal portion of the basistyle with approximately 7 slender setae. Dististyle appendage 0.70–0.72 as long as the dististyle. Blade of claspette not noticeably enlarged medially, uniform in texture. Ninth tergite with 1–3 bristles on each lobe.

Female.—Wing: 2.3 mm. Differs from the female description of *saperoi* as follows: Palpus approximately one-fifth as long as the proboscis. Torus bare. Lateral white-scaled areas of scutum broadly connected anteriorly, lateral margin of scutum before wing base dark scaled halfway to scutal angle (nearly all of margin along paratergite dark scaled). No white scales around the prescutellar bare space. Scutellar lobes dark scaled. Forefemur dark, pale scales on basal median posterior aspect; midfemur dark, broad pale area ventrally on basal half of posterior aspect; hind femur white; apical one-third all dark.

Larva.—Head: Antenna with hair tuft inserted before middle, 5–6-branched; subterminal bristles equal. Inner mouth-brush hairs with very small fine comblike tips. Head hair 4 with 8 branches, 5 with 6–7, 6 with 5–6, 7 with 8–9, 8 with 2, 9 with 4–6, and 12 with 11–12. Mentum with 9 lateral teeth. *Abdomen* (Fig. 14): Dorsolateral hair of I with 3 branches, lateral hair with 2; lateral hairs of II–VI with 2 branches. Pentad hair 1 with 5–6 branches, 3 with 7–8; 5 with 6. Comb teeth 8 in number, with lateral fringe on basal half. Siphon largely smooth, transverse striations present basally; index about 2; detached acus; hair tuft 6–7-branched; 12–13 pecten teeth, basal teeth the smallest, evenly pigmented, a stout lateral denticle, 1–3 smaller spines generally present; length of apicodorsal hair distinctly less than one-half the width of the siphon apex. Anal plate with a patch of short laterocaudal spines, lateral hair 3-branched, *ise* 3-branched. Ventral brush with 8 tufts, each tuft 3–4-branched. Anal gills broadly lanceolate, dorsal pair about 2.0 times longer than the ventral pair and 1.5 times longer than the anal plate.

Types.—Holotype: Male, with dissected genitalia (U.S.N.M. No. 57921), Laoag, Ilocos Norte Province, Luzón, Philippines, June 1945 (Harry Hoogstraal), reared from a tree hole. *Paratypes:* 1 female, 1 mature and 1 immature larva, same data as for holotype; 1 male, Baguio, Luzón, August 1945 (S. E. Shields), reared from a tree hole. Deposited in U. S. National Museum.

Discussion.—On the basis of the adult key in this paper, 3 female specimens (2 with associated larval skins) reared from tree holes at Subic Bay and San Fernando, Luzón (M. J. MacMillan), appear to be this species but differ slightly in adult and larval characters.

These differences could quite possibly be due to the species being based on such scanty material. Two of the adults have the white-scaled scutal area complete, while the third has this area medially broken by a dark-scaled area as in the type female of *laoagensis*. Other differences are: Wing, 3 mm; torus with minute black scales. The larva differs as follows: Head hair 4 with 8–10 branches, 5 with 6–8, 6 with 4–7, 8 with 2–3, and 12 with 12–16. Mentum with 9–10 lateral teeth. Comb teeth 8–10 in number. Siphon index 2.7 (from skins); acus attached; hair tuft 4–6-branched; 14–21 pecten teeth. Lateral hair 2–4-branched. Dorsal anal gills approximately equal to the anal plate in length.

In the U. S. National Museum, there are 4 female specimens (Luzón: Rizal, Laguna, and Tayabas Provinces) which also would appear to be *laoagensis* on the basis of dark scaling on the lateral scutal margin above the paratergite.

In the absence of males and because of the slight differences given above, none of this material was included in the type series.

Aedes (Finlaya) dorseyi, n. sp.

Male.—Wing 2.5 mm. Differs from the description of *saperoi* as follows: Vertex with brownish-yellow scales (Median area darker in some lights) except in the lateral corners and along eye margins, where they are white; forked uprights pale. Scutum with no white scales around the prescutellar bare space. Lateral scutellar lobes with broad dark scales, median lobe with broad pale scales. Prealar area bare (one broad white scale on one side) Coxae all pale scaled. Forefemur with anterior aspect dark on apical half or more, pale basally, posterior aspect pale except for dorsoapical portion; midfemur with anterior aspect dark, posterior aspect pale yellow except dorsoapical margin, dorsal and ventral margins pale; hind femur pale, apical one-sixth dark scaled dorsally, the dark scaling reduced laterally and nearly interrupted ventrally. *Genitalia* (Figs. 4 and 11): Inner dorsal margin of basistyle with a band of stiff curved setae, those near the apex being considerably longer than the others; basally the inner surface bears a clump of very long, extremely narrow scales; the sclerotized ridge on the dorsal inner basal margin with 5–7 stout setae. Dististyle appendage 0.50 as long as the dististyle. Blade of claspette not noticeably enlarged medially, uniform in texture. Ninth tergite with 2–4 stout setae on each lobe.

Female.—Wing: 2.66 mm. Differs from the female description of *saperoi* as follows: Palpus approximately one-sixth as long as the proboscis. Torus bare. Forked upright scales of vertex yellowish brown. The lateral white-scaled areas of the scutum not connected anteriorly; no pale scales around the prescutellar bare space. Scutellar lobes with broad dark scales, mid lobe may be partially pale-scaled. Femora marked as in the male (*dorseyi*), dark-scaled apex of hind femur may be narrowly interrupted ventrally. Halter dark-scaled, or with dark and light scales. Abdominal tergites V–VIII with complete basal bands.

Larva.—*Head* (Fig. 18): Spicules of antennal shaft distinctly finer than in the other species described in this paper; hair tuft before middle 5–7-branched, subterminal bristles subequal. No mouth-brush hairs were seen with comblike tips. Head hair 4 with 4–7 branches, 5 with 3–7, 6 with 4–6, 7 with 7–10, 8 single, 9 with 3–4, 12 with about 9 main branches. Mentum (Fig. 20) with 6–7 lateral teeth. *Abdomen* (Fig. 17): With sparse stout stellate tufts on I and II. Dorsolateral hair of I with 4 branches, lateral hair with 1–2; lateral hair of II with 3; lateral hairs of III–VI double (once 3). Pentad hair 1 with 3–5 branches, 3 with 3–5, 5 with 4. Comb teeth 10–12 in number, with pale lateral fringe to just before apex, all connected basally by a sclerotized area except frequently the end one. Siphon smooth; index about 2.5; small detached acus present; hair tuft 5–7-branched; 20–25 pecten teeth, basal teeth the smallest, tips pale, a stout lateral denticle, 1–3 minute spines frequently present basally; length of apicodorsal hair approximately one-half the width of the siphon apex. Anal plate with a prominent laterocaudal patch of spines; lateral hair 2–3 branched; *isc* about 7-branched. Ventral brush with 10 tufts, each tuft 4–7-branched. Anal gills somewhat budlike (only visible in one specimen) in shape, dorsal pair 1.3 times longer than the ventral pair and 0.5 as long as the anal plate.

Types.—*Holotype:* Male, with dissected genitalia (U.S.N.M. No. 57922), Garakayo, Palau Islands, August 1945 (C. K. Dorsey and H. Dybas), reared from a tree hole. *Paratypes:* 2 larvae, same data as holotype; 5 males, 5 females, 3 larvae, Peleliu, Palau Islands, March

and August 1945 (C. K. Dorsey), the larvae reared from a steel drum and a tree hole. Paratypes deposited in U. S. National Museum.

This is the first member of the *niveus* subgroup to be described from the Australasian region.

This species is dedicated to one of the collectors.

Aedes (Finlaya) niveus (Ludlow)

1903. *Stegomyia niveus* Ludlow, Journ. New York Ent. Soc. 11(3): 139. (Female.) (Type locality: Oras, Samar. Female lectotype in Brit. Mus.; lectoparatypes (all females) in U. S. Nat. Mus.)

1910. *Stegomyia pseudonivea* Theobald, Mon. Cul. 5: 176. (Male only.) (No pertinent details of male genitalia. Andaman Is. specimen in Brit. Mus. The female of *pseudonivea*, described in 1905, is another species.)

1931. *Aedes* (*Finlaya*) *niveus* (typus) (Ludlow), Brug, Arch. Hydrobiol. Supp.-Bd. 9: 25. (First association of male genitalia and larva. Sumatra. Bali.)

Male.—Wing: 2.75. Differs from the description of *lacteus* as follows: A few broad dark scales along dorsal margin of *ppn* (rarely a number of these scales are present). Midfemur all dark except for a line of pale scales on the basal half of the posterior aspect. *Genitalia* (Figs. 5 and 9): Inner dorsal surface of basistyle covered with short, stiff, curved setae, those near the apex being considerably longer than the others; basally the dorsal inner surface bears a sparse clump of very long setiform scales; the sclerotized ridge along the dorsal inner basal margin with 6–9 stout setae. Dististyle appendage 0.56–0.66 (4 specimens) as long as the dististyle. Blade of claspette only slightly enlarged medially, uniform in texture. Ninth tergite with 3–4 stout setae on each lobe.

Female.—Wing: 2.75 mm. Differs from the female of *lacteus* as follows: Palpus approximately one-fifth to one-sixth as long as the proboscis. Scutum with the anterior two-thirds solidly white scaled, the white scaling extending along the lateral margin to a level with the prealar area, no white scales around the prescutellar bare space. Midfemur dark, a line of ventrobasal pale scales on posterior aspect, these may extend onto ventral aspect. Abdominal tergites from V on with complete dorsal bands.

Larva (10 larval skins, associated with adults, from Palawan and Luzón).—*Head:* Antenna with hair tuft inserted just before middle, 7–13-branched; one subterminal bristle from one-third to one-half the length of the other. Median mouth-brush hairs with prominent comblike tips (visible in only one specimen). Preclypeal spines distinctly slenderer than in the other species described here. Head hair 4 with 7–11 branches, 5 with 6–12, 6 with 6–10, 7 with 8–14, 8 with 1–3, 9 with 3–5, 12 with 10–15. Mentum with 8–10 lateral teeth. *Abdomen* (Fig. 16): Prominent stellate tufts present. Dorsolateral hair of I with 4–7 branches, the lateral hair with 1–2; lateral hair of II with 3–6; lateral hairs of III–VI with 2, rarely single. Pentad hair 1 with 5–7 branches, 3 with 5–7, 5 with 4–8. Comb teeth 12–16 in number, with prominent lateral fringe to just before apex. Siphon smooth; dark, except for apical portion; index approximately 2; acus detached; hair tuft 6–11-branched; 17–23 dark pecten teeth, basal teeth the smallest, each tooth pale apically, a stout lateral denticle, one or more minute spines usually present on basal portion; length of apicodorsal hair more than one-half the width of the siphon apex. Anal plate with a group of prominent laterocaudal spines, lateral hair 1–3 branched (usually double), *isc* 7–9-branched. Ventral brush with 10 tufts, each tuft with 5–12 branches. Anal gills broadly lanceolate, dorsal pair 1.1–1.3 times longer than the ventral pair and 0.55–1.0 as long as the length of the anal plate.

Brug (1939)[9] states that the larva of *niveus* (Netherlands Indies) does not have the acus detached. Otherwise, the Philippine material checks well with his description. The larva occurs commonly in tree holes (frequently in mangrove areas) and bamboo stumps. One record from deep sheltered rock holes exists.

Taxonomic discussion.—Ludlow sent a specimen of this species to Theobald and allowed him to quote her description (Mon. Cul. 3: 139. 1903). This specimen was designated as type (lectotype) byBarraud (1934). A series of three females bearing red type labels (Type No. 27792) exist in the U. S. National Museum. Although the lectotype has not been seen for comparison, these are considered lectoparatypes on Ludlow's inclusion of them in the original type series.

It is unfortunate that the first association of

[9] Brug, S. L., Tijdschr. Ent. 82: 106. 1939.

a male and larva with this species was done from material collected far from the type locality. However, recent associated larval-adult collections made by the author and others in the Philippines have disclosed that a common member of the *niveus* subgroup found there has a male and larva as described by Brug and a female that fits Ludlow's description; so it seems apparent that Brug's association is correct.

Ludlow's specimens have the black area of the hind femur confined to slightly less than the apical one-fifth of the anterior aspect, although on the dorsal aspect the black scaling is more extensive. In this character, her specimens show a slight variation from the material used for the above description, in which the black of the anterior aspect is usually as extensive as that on the dorsal aspect and is one-fourth or more of the femur. Ludlow states that the female tarsal claws are simple but an examination of a mid leg of one of her specimens showed that the claws are toothed.

Distribution.—Because of the number of closely related species, literature records of *niveus* must be considered with caution, unless careful descriptions are appended. Feng's[10] description of *niveus* is an example of this.

Specimens were examined in the U. S. National Museum from the following areas: PALAWAN: Puerto Princesa, Irahuan River, Tacburos (J. L. Laffoon and D. R. Johnson). SAMAR: Oras. LUZÓN: Batangas (H. Hoogstraal), Subic Bay (L. E. Rozeboom). Apparently reliable literature records are from: South Bengal, Ceylon, Andaman Islands, Sumatra, Bali, Java, Flores, Malacca, Borneo, and Siam. The records from China and Japan are probably not this species. Of the Philippine records given by Bohart (*A synopsis of the Philippine mosquitoes*, NAVMED. 580. 1945): only that for Oras is definitely this species.

Aedes (Finlaya) albolateralis (Theobald)

1908. *Stegomyia albolateralis* Theobald, Rec. Ind. Mus. **2**: 289. (Female.) (Type locality: Sylhet, Assam. Type: females, in Indian Mus.)

1908. *Stegomyia nivea* Ludlow. Leicester, The Culicidae of Malaya: 87. (Description implies a misidentification.)

1922. *Aedes* (*Finlaya*) *albolaterlis*, Theobald. Edwards, Indian Journ. Med. Res. **10**(2): 465. (Misspelling.)

1923. *Finlaya nivea* (Ludlow). Barraud, Indian Journ. Med. Res. **11**(2): 480. (In part. Figure of male genitalia.)

1931. *A.* (*F.*) *niveus* var. A. Brug, Arch. Hydrobiol. Supp. Bd. **9**: 25. (First separation by male genitalia.)

1932. *A.* (*F.*) *niveus* Ludlow. Edwards, Genera insectorum, fasc. **194**: 154. (In part. Questioned synonymy of *albolateralis*.)

A damaged male of this species from Doom Dooma, Assam (D. E. Hardy), was available in the U. S. National Museum. It agrees with Barraud's (1934)[11] description except that the mid femur is largely dark (a small basal ventral line of pale scales is present on the posterior aspect). Barraud does not show complete setal details of the inner dorsal surface of the basistyle so that a figure has been prepared for this paper (Fig. 6). Also, he shows the texture of the blade of the claspette undifferentiated, whereas in the specimen examined here the enlarged portion of the blade is clear (Fig. 8).

A single unassociated larva (collected from a tree hole on Culion Island, Philippines, Jean L. Laffoon) was taken that checks well with Barraud's (1934)[11] description of this species. It differs slightly as follows: Antennal hair tuft 7–8-branched. Head hair 4 with 13–14 branches, 7 with 9. Mentum with 8 lateral teeth. Dorsal anal gills 1.6 times as long as the anal plate and about 1.2 times as long as the ventral pair.

Distribution.—There are apparently reliable literature records of this species from: Assam, North Bengal, western Himalayas, north Kanara, and Malaya. The records from Japan are doubtful.

Aedes (Finlaya) novoniveus Barraud

1934. *Aedes novoniveus* Barraud, Fauna of British India, Diptera, **5**: 211. (Males and females.) (Type locality: Mungpoo, Darjeeling Dist., eastern Himalayas. Type: Male, in Brit. Mus.)

Male.—Wing: 2.5 mm. Resembling the description of *saperoi* but differing as follows: Vertex covered with white scales, forked uprights brownish yellow. Scutum completely covered with white scales except on the prescutellar space, which is bare. Scutellum with broad white scales. Forefemur as in *saperoi* but with the posterior pale area only extending

[10] FENG, L., *loc. cit.*

[11] *Fauna of British India, Diptera*, **5**: 205.

slightly beyond middle, and reaching the dorsal margin along most of its length; midfemur dark, a patch of white scales basally on the ventral aspect, posterior aspect white basally, the white extending apically along ventral margin; hind femur white, apical one-fourth completely dark. *Genitalia:* Basistyle with inner dorsal surface covered with slightly curved short stiff setae; basally the dorsal inner surface bears a sparse clump of long setae; the sclerotized ridge on the dorsal inner basal portion of the basistyle not visible in the specimen available but figured by Barraud as carrying a row of about 8 setae. Dististyle appendage 0.5 as long as the dististyle. Blade of claspette distinctly widened medially, the enlarged portion of a clear texture. Ninth tergite with 4 stout setae on each lobe.

Taxonomic discussion.—Neither female nor larval specimens of this species were available. The specimen (U.S.N.M.) used for the above description of the male is from the Cameron's Highland, Federated Malay States, and was reared from bamboo. It was identified (without use of genitalia) by Edwards in 1923 as *niveus*.

Distribution.—Eastern Himalayas, Assam, and Malaya.

Aedes (Finlaya) idjenensis Brug

1934. *Aedes* (*Finlaya*) *niveus* var. *idjenensis* Brug, Bull. Ent. Res. **25**: 513. (Sex not stated, but female by inference.) (Type locality: Eastern part of the Malay Archipelago. Location of type not recorded.)

This form is specifically distinct on the possession of a patch of flat broad scales on the posterior part of *ppn*. Feng's[12] *niveus* is apparently a closely related species.

Aedes (Finlaya) niveus subgroup, unidentified species

Four females, which were reared from a tree hole at Zamboanga, Mindanao (Jean L. Laffoon), appear to be yet another species of the *niveus* subgroup. However, in the absence of males, the species is not named here.

In the key to adults these specimens key to *niveus* and the other species grouped there. They differ from *niveus* (at least Philippine specimens) in possessing white scales along the prescutellar space and in having a prominent median ventral band of silver scales on the anterior aspect of the midfemur. In connection with this last character, it is not completely clear from the description of *pseudoniveus* (Edwards, in Barraud's Fauna of British India, Diptera, **5**: 105. 1934) just what the median silver spot of the midfemur is like in that species. Therefore, it is possible that this species should go to *pseudoniveus* in the adult key.

The larvae (3 isolated skins) go to *alboniveus* in the key given in this paper. Unfortunately, Barraud's (1934)[13] description of the larva of *alboniveus* is too fragmentary for complete comparison. Because of this fact, a brief description of the Mindanao larva is given here. Antennal hair tuft 9–14-branched; subterminal bristles distinctly unequal. Head hair 4 with 15–19 branches, 5 with 8–14 ,6 with 10–12, 7 with 12–14, 8 with 2–3, 9 with 6–9. Mentum with 9–10 lateral teeth. Lateral hairs of abdominal segments I–VI double. Comb teeth 8–10 in number, fringed on basal portion of shaft. Siphon index approximately 3.4; acus detached; hair tuft about 4-branched; 14–16 pecten teeth, a stout lateral denticle present, 1 or more minute spines present basally; length of apicodorsal hair less than one-half the width of the siphon apex. Lateral hair of anal plate double. Ventral brush with 8 tufts, each tuft 3–4-branched. Anal gills extremely elongate, slender, dorsal pair 1.2 times longer than the ventral pair and 3.4 times as long as the anal plate.

[12] FENG, L., *loc. cit.*

[13] *Fauna of British India, Diptera*, **5**: 210.

ZOOLOGY.—*A remarkable new genus and species of West American marine mollusks.*[1]

PAUL BARTSCH, U. S. National Museum.

Some time ago the U. S. National Museum received a lot of a very remarkable minute marine mollusk transmitted to us for identification by Mrs. Carrie L. Simons. An examination of the radula proves this to be rhipidoglossate, while the operculum is thin, corneous, and multispiral. I believe the genus to be a member of the superfamily Trochaceae, with the genotype *Coronadoa simonsae*, n. sp., here described.

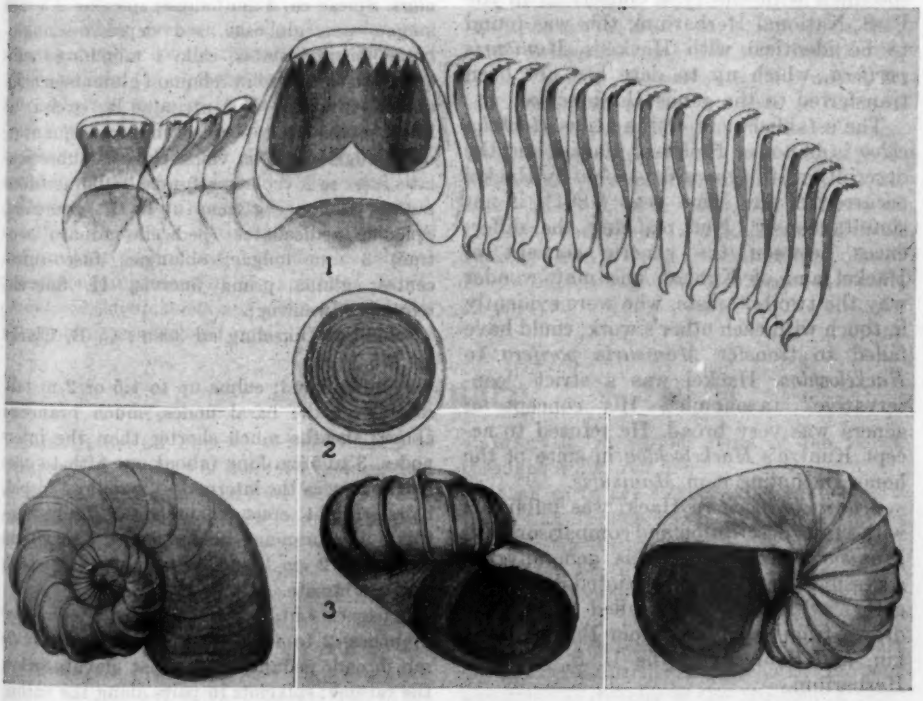
Coronadoa simonsae, n. gen. and sp.

Shell minute, helicoid, thin and translucent, yellowish white, the nucleus consisting of one well-rounded smooth turn. Postnuclear whorls strongly rounded, provided with scalariform ridges, which extend from the summit to the umbilical area; these ridges are a little more closely crowded on the first postnuclear turn than on the succeeding, becoming evanescent on the last half of the last whorl. Periphery of the last whorl rounded. Base well rounded, with an impressed umbilical chink. Aperture very large, subcircular; outer lip rather thin; inner lip very broad, showing a decided excavation; operculum thin, multispiral. The radula has a 5-cusped rachidian tooth followed by three tricuspid laterals and a 9-cusped major lateral, which is succeeded by 14 4-cusped marginals. The shape of these teeth is shown in Fig. 1.

This little mollusk was discovered by Mrs. Carrie L. Simons, for whom the species is named. The greater diameter of the type, U.S.N.M. No. 346654, an average specimen, is 0.6 mm and the altitude about 0.5 mm.

Of the finding of these specimens Mrs. Simons says that they were collected by Frank

[1] Published by permission of the Secretary of the Smithsonian Institution. Received March 25, 1946.



FIGS. 1–3, *Coronadoa simonsae*, n. gen. and sp.: 1, radula; 2, operculum; 3, shell.

Stephens, of the San Diego Society of Natural History, on North Coronado Island, which is almost inaccessible, rising precipitously from the deep water with no beach, so that landing here is effected with great hazard. Mr. Stephens brought a small quantity of sand, really crushed rock, which he found under one rock at the water's edge in April 1921.

U.S.N.M. No. 346655 contains a lot of additional specimens, while the major portion is in Mrs. Simons's collection. Mrs. Simons estimates that there are about 250 specimens of this species in the sending she transmitted. Mrs. Simons's collection is now in Stanford University.

BOTANY.—*A second species of* Hackelochloa.[1] RUTH CHEN-YING CHOU, U. S. National Museum. (Communicated by AGNES CHASE.)

During the identification of grasses from Burma collected by R. O. Belcher and M. L. Steinecker my attention was called to *Hackelochloa*. This genus, since its establishment by Otto Kuntze (1891), has remained monotypic, containing the single species *Hackelochloa granularis* (L.) Kuntze. In the Burmese collection a second species of the genus was found. Comparing the specimen with the type collections in the U. S. National Herbarium, this was found to be identical with Hackel's *Manisuris porifera*, which up to date has not been transferred to the genus *Hackelochloa*.

The establishment of the genus *Hackelochloa* in honor of Professor Hackel and the description of *Manisuris porifera* by Hackel occurred in the same year (1891), if not simultaneously. Not realizing the differences between the generic concept of Hackel and of Kuntze, one may wonder why the two botanists, who were evidently in touch with each other's work, could have failed to transfer *Manisuris porifera* to *Hackelochloa*. Hackel was a strict "conservative" taxonomist. His concept of genera was very broad. He refused to accept Kuntze's *Hackelochloa* in spite of the honor, including it in *Manisuris*.

Manisuris porifera Hack. was published with a brief description and comparison with *Manisuris granularis*. This generally inaccessible description is quoted below together with a more detailed description drawn from specimens from Burma, Tonkin, and Sumatra in the U. S. National Herbarium.

[1] Received June 24, 1946.

Hackelochloa porifera (Hackel), nov. comb.

Manisuris porifera Hackel, Oesterr. Bot. Zeitschr. 41: 48. 1891.

"Spiculis ♂ depresso-semiglobosis, gluma I. basi utrinque poro rotundo ab articulo distincta, grosse foveolata et tribus rugis elevatis transversis pluribusque longitudinalibus brevibus notata.

"Culmi, folia, inflorescentia ut in *M. granulari*. Spicae ca. 3 cm longae; spiculae 2.5 mm longae, non globosae, sed depresso-semiglobosae, brunnescentes, callo 1 mm longo subquadrato foveolato in reliquam glumam sensim abiens. Gluma I. basi utrinque ita excisa, ut inter se aximque pori rotundi relinquantur, dorsa rugis v. costis valde elevatis subreticulatis inter se foveolas profundas relinquentibus notata. Reliquae glumae ut in *M. granulari*. Spiculae pedicellatae (pedicello adnato neutrae) 3 mm longae, oblongae, fusco-rufescentes; gluma prima 5nervis, II. 3nervis, reliquae θ [wanting].

"Sikkim: Dikeeling ad 3000′. C. B. Clarke nr. 975."

Plants annual; culms up to 1.5 or 2 m tall, rooting at the basal nodes, much branched above; sheaths much shorter than the internodes, 3 to 5 cm long (about one-fifth to one-half as long as the internodes), papillose-hispid, hairs straight, erect or spreading; ligules fimbriate-membranous; blades flat, up to 20 cm long, 1 to 2 cm broad, base subcordate, both surfaces hirsute.

Racemes solitary, terminating the culm and branches, 2 to 4 cm long, 1 to 1.5 (rarely 2) mm broad; peduncle somewhat clavate below the raceme; spikelets in pairs along the rachis, the fertile sessile, the sterile pedicellate, the

pedicel and rachis-joint adnate; fertile spikelets obovate, dorsally compressed, the margins inflexed, about 2 mm long, 1.5 mm wide, more or less vertically arranged on the rachis, thus appearing as a single vertical row; first glume coriaceous, with sharply raised angular ridges surrounding thin round spaces, thus appearing porous or pitted, closely appressed to the rachis, covering the entire floret; second glume adnate to the rachis, small, pale, covered by the first glume; glumes of the sterile spikelets chartaceous, often purplish (in dried specimens); lemma and palea obsolete.

Hackelochloa granularis, the type of the genus, is found in tropical and subtropical countries of both hemispheres. In the U. S. National Herbarium there are specimens from India, Ceylon, South China, Formosa, Philippine Islands, East Indies, Australia; and eastward to the Hawaiian Islands, United States, Central America, West Indies, and South America. *H. porifera*, so far as known, is limited to the eastern hemisphere—India, Burma, Tonkin, and Sumatra.

Hackelochloa porifera is slightly taller and somewhat more robust than *H. granularis*. In *H. granularis*, the sheaths rarely exceed 3 cm long, whereas those of *H. porifera* often range from 3 to 5 cm. However, the variation in size and general habit of the plants may be influenced by environmental and physiological conditions and therefore are unreliable to serve as a criterion for specific distinction. The two species are best differentiated on the size, shape, and the arrangement of the spikelets. In *H. granularis* the spikelets are globose or subglobose, seldom exceeding 1 mm in diameter, and more obliquely arranged on the rachis, each raceme therefore bearing two distinct rows of alternate fertile spikelets with the glumes of the sterile spikelets above. The first glume of the fertile spikelets in *H. granularis* is verruculose, finely reticulate or granulate with margins inrolled downward like a pouch. The fertile spikelets in *H. porifera*, on the contrary, are oval, half as broad as long, almost vertically arranged on the rachis with the tip of one spikelet pointing nearly directly at the base of the next one of the alternate row, the two rows of fertile spikelets thus appearing as a single one. The first glume of the fertile spikelet is strongly reticulated with prominent ridges and pitted thin spots, with margins sharply bent inward and ridged at the edge like turtle shell, and closely appressed to the rachis. The sterile spikelets, composed of glumes only, are lateral in position.

Type specimen.—C. B. Clarke no. 975 in Herb. Hackel, from Sikkim, India; fragment in U. S. National Herbarium.

Other specimens studied.—Burma: Mytkyima-Sumprabum Road, on open roadside, clay bank, *Belcher & Steinecker 819*, October 16, 1945. Tonkin: *Balansa 4940*, September 21, 1891. Sumatra: east coast, Vale of Tangga, Asaham, steep jungle path to Adian Langge, *Bartlett 8085*, May 12–21, 1927; vicinity of Rantau Parapat, Bila, *Rhamat Si Toroes 1731, 1788*, March 28–May 10, 1932; Tapianoeli Division Padang Si Dimpoean, Subdivision Padang Lawas, along the Aek Roppak, near Hoeta Imbaroe, *Rahmat Si Toroes 4742*, June 22–30, 1933.

Obituary

THOMAS BARBOUR, director of the Museum of Comparative Zoology of Harvard College, died in Boston, Mass., on January 8, 1946, the immediate cause of his death being a cerebral hemorrhage. Son of wealthy parents, he was born on Marthas Vineyard Island on August 19, 1884, and was graduated from Harvard University in 1906, returning to that institution for the master's degree (1909) and for the Ph.D. degree (1911). Before completing his studies he made extensive collecting trips to the West Indies, Chile, Mexico, India, and Malaysia, and this field work was continued, at intervals, in various parts of the world, throughout his later life.

At an early age Barbour elected to follow zoology as a profession. In fact, the reason for his selecting Harvard University as the institution for his undergraduate and graduate training was the unique zoological facilities offered by the museum that Louis Agassiz founded and that later became an integral part of Harvard University; and when Dr. Barbour appointed as director of the Museum in 1927, he was fourth in succession from Louis Agassiz. In 1928 he was appointed as professor of

zoology, and in 1944 as Alexander Agassiz professor of zoology. From the time that he received his Ph.D. degree in 1911, when he was appointed to an assistant curatorship in the Museum, to his untimely death in 1946 (for he had not attained his sixty-second birthday), he was constantly associated with the Museum of Comparative Zoology, serving as a volunteer servant of Harvard University, with only a token salary, for zoological research was his abiding interest; and the extraordinary zoological facilities that were available to him at Harvard were exploited to great advantage during the ensuing busy years.

He was fortunately in a position where he could be of great service. From his ample private income he granted distinctly large sums to support work in which he was interested, not only to the Harvard Museum of Comparative Zoology, but to other institutions as well, including the Barro Colorado Island Station in Panama, which to a considerable degree owes its existence to Dr. Barbour's continued support, the Atkins Institution of the Arnold Arboretum in Cuba, and the New England Museum of Natural History. In relation to those institutions and projects in which he had confidence he was not only liberal within his means, but, what is better, intelligently liberal.

A prolific writer on an extraordinarily wide range of subjects in zoology, Dr. Barbour's technical titles number nearly 400. In his own words, he was "by inclination an old-fashioned naturalist, many tell me the last of the breed. My colleagues prefer to know more and more about less and less, and so are infinitely more erudite than I." He was a world authority on the classification of reptiles and amphibians, but he wrote with authority also on such diverse subjects as ornithology, mammology, conchology, ichthyology, entomology, and paleontology. Outside of his strictly zoological interests his services were in demand in other quarters, for, among other distinctions, he served as president of the New England Museum of Natural History, a trustee of Radcliffe College and of the Carnegie Institution of Washington, a member of the Advisory Board of the Guggenheim Foundation, a member of the Council of the Harvard University Library, and a syndic of the Harvard University Press.

Because of his retentive memory, wide interests, command of the English language, and his human attributes, in his later years he developed an extraordinary talent for preparing popular publications. The narrow specialist seldom or never attains such a position. Beginning with his *Naturalist at large* (1943), which is in part autobiographical, and closing with the posthumous *A naturalist's scrapbook* (1946), he succeeded in popularizing certain aspects of his zoological interests in a most striking manner; in fact, the picture he painted of what man has done to nature in Florida within the present century in his *That vanishing Eden* (1944) is actually having a profound effect on the manifestly much-needed conservation program in that State, as to its water, land, and biological resources.

In the course of his productive career, Dr. Barbour was the recipient of many distinguished honors, having been elected to membership in such domestic and foreign societies as the National Academy of Sciences, the American Philosophical Society, the American Academy of Arts and Sciences, the Royal Asiatic Society, the Royal Geographic Society, the Linnean Society of London, the Zoological Society of London, the Nederlandsche Dierkundige Vereen, and the Havana Academy of Sciences. In the academic field he was the recipient of the S.D. degree from the University of Havana (1930), from Dartmouth College (1933), from Harvard University (1940), and from the University of Florida (1944).

Dr. Barbour was a commanding figure in any gathering, for he was 6 feet 5 inches tall and proportionately stout, weighing in excess of 300 pounds. He did not hesitate to express his ideas, and this he could do in a very trenchant manner. His judgment was excellent and his conclusions usually well taken. His sense of humor was very keen, and many Barbourisms will doubtless persist for a long time to come. His very numerous friends at Harvard University and elsewhere will long keep his memory green. His lasting position as an outstanding zoologist is assured.

He was the son of William and Adelaide (Sprague) Barbour of New York City. He is survived by his wife, Rosamond Pierce Barbour of Boston, three daughters, Mrs. Mary Bigelow Kidder, Miss Julia Adelaide Barbour, and Mrs. Louisa Bowditch Parker, and two brothers, Robert Barbour and Frederick K. Barbour.

ELMER D. MERRILL